Mon Mar 9, 64 — TMY.

Plan

From 730.40 →

01 : 733.40 : Ultimate TM :

02 1) Devises new physical laws of hy aprip, and tells what their apri
Devises expts. to test these laws that are "cheapest" with resp. to stated
resources.

2) Invents devices of "min. cost" to perform stated need
→ min. ←

3). Finds / applicns. of new known inventions

4) Finds needs and devises new inventions (when req'd)
to fill them.

5) SM and HR ; Is able to read in all relevant data,
and form predns. and best strategies of max expected
gain.

6) Is able to do ~~novation~~ law ~~analogy~~ "discovery";
and decide on action to bring about stated result,
in sociology.

25 7). Is able to devise (and often prove) theorems in
Math; which turn out to be of much interest to Mathians
[redacted]. Works very diflt. probs, like various of Hilbert's probs, w.o
or indirect knowl. of, solns. (e.g. let TM read journals only up to
pt. where Hilbert proposed R. problems).

8) Is able to teach various things to a human (or any other ani
at an optimum speed. e.g. languages, math, customs of a country,
— for animal learning, we mitarpire TM / R. intercranial reanft. chain
access to

M Mar 9, 64 T.M.J

Plan

.01: 734.40: Re: Th. Physics machine of 734.02:

"TM will be able to read Physics Journal papers and answ. Q's about Phen. In particlr. TM will be able to say to what of a gn. physical law is confirmed by an experiment dcrbd in a gn. paper."

Re: Th. Math Machine of 734.25: TM should be able to read Math papers and answ. Q's about Phen. Also should be able to apply info in a Math paper to srby. probs. This sort of thing sounds a lot easier than Th. corresp. prob. for a "Physics Machn." — and it may make a good "study prob." a/o intermd. step.

Th. Phy. Mac's work can, initially, be divided into several phases: ① Learn to map input Q's and data in English into internal symbolic lang. Q's are expressed as a criterion for acceptability of a set of statements within Th. symb. ② Learn to make logical manips. on Th. "true" symb. s's so as to try to arrive at acceptable "answers". ③ Learn to x/l from symb. lang. into English. This last may be very easy — and perhaps unnecy — since symb. lang. will be easily understood by a Human, via a simple co... Hvr. We may want TM to express its internal-form answ... in a litterary form that is "more readable" by humans.

At any rate, a machine that can learn to do ① an... learn to do MT, if a corpus of (Eng's, symb. lang's ... gn. (also, say (symb. lang, Russ) s' pairs). ... want TM to preserve s. to s. info content ...

Tu Mar 10, 64

01; 735.40 : After TM has learned to work probs. by doing these 3. .02 steps, we will let him try non-al. solns to Th. probs. and not nacly. use those 3 steps.

Apart, we should probly try this on Math probs. first — both "pure math." (like "what are some common math factors if any, of the matrices $\begin{pmatrix} 31 & 18 \\ 90 & 34 \end{pmatrix}$ and $\begin{pmatrix} 5 & 32 \\ 18 & 6 \end{pmatrix}$ that have integral elements?") or word problems like "A rect. room is 3 ft. longer than it is wide .... etc." Even in such word problems, hvr., one must sometimes know enuf about the physical world — like: "Th. amt. of paint needed is oc Th. area of the wall".

— So, Tell T.M those things — like Bobrow does with his system.

Q.I.: At Th. present time, Th. probs. resolve into:

1. Th. induction of <'Eng' → log. lang.> of 735.20.

2: Th. solving of R. xfml. probs. of 735.30 - which is like Th. probs. of GPS.

I don't see how all this fits into my work on Bern. Seq, ZTB-141, Sloglas work, etc. — And I would like to use "info" contained in that work.

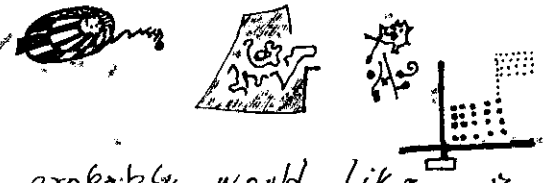
Hvr., I want to spend a min. amt. of my own time devising Tng. Seqs. for TM. I would like, as soon as possl., to get TM to Th. pt. where a Tng. seq. could consist of textual data, Q's and A's all in English.

To do this, I could start out with simple Eng. text, that I would prepare, and try to get TM. to do a non-al. soln. of these (as .02) as soon as possl. Then I would feed him more complex text. — More complex than problems. Also, Th. form of Pictures and graphs

W Mar 11, 64 JMB

Plan

-01: 736.40! Somewhere along here, we will want TM to be able to improve itself. We must then devise a typ seq. so that ⇒ th. self-improvement and ability to understand Engs., occurs at pts. or intervals ⇒ ⟨th. amt. of work I have to do in typ. seq. preparn is minimized.



So, what I probably would like, is to have a QA TM for "principal mode" of P.MTM. I can have Eng → symb. log → Eng, and Q answg. in symb. log. be / separate mode. When TM has enuf success in these 3 modes, he can use th. inductive abss. in each for th. potentially non-el. Q.A. mode.

Just about all probs fed into th. non-QA mode would be meant to be used by th. QA mode eventually.

So, what I have to do now, is look at what th. solns. to th: QA mode look like — both el. and non-el. sp. Then look at th. solns. to th. el parts of th. el. solns. Then look at th. solns. to some other modes, (like th. proving, PSG finding, etc), and see just how th. info is coupled into th. other mode from them. Also, I want to see just how various types of heurs. enter into th. solns. In particular, I want to see just what types of heurs can be expressed as ⟨th. introduction of a new symbol with a certain pos⟩.

for Eng → symb. log, th. ob-op. notation seems adequate. Also, its probly adequate for logical m. in th. Symlog logo. — and for conversion ba. very much like "Lisp" — I.e. It's sho.

W Mar 11, 64 TMY

Plan

.01.737.40 ; express all I want in R.ob-op algebra, by means of LISP — And Lisp will supp. necy. expansions of R. lang. to give Univ

Hvr, certain recursive defns. can be implemented by R. ob-op notation — i.e. McCarthy's "conditional expressions" can be express by ob-op notation. I don't know if other defns. can be as easily done this way, hvr.

One thing that we want TM to be able to get from Eng. text is TM should be able to x/l. some Eng. ss into probly. statem in Sym. Log. E.g. say R. Eng. S is ambig.; TM should be able to assign probly values to the various possys. Also, the connotative meaning of an Eng. S. often is very problistic. Tho it may, in theory, be poss'l. for TM to figure these out from the corpus, I suspect that the corpus fed to TM will have too few cases of R. relev kind of data to make this induction — so I'll have to pretty much hand-feed TM on this.

Also, statements like "It is likely that . . ." will initially mean a probty of, say .9, with (sample" of, say, ≈5. Later TM can get more accurate probty values for such statements.

SN perhaps it would be easiest, at first, to communicate (input and output) with TM in Interlingua or Esperanto, or some similar lang. that has a simpler Gramm. than Eng. does. Or, I could use a lang. = sym'b. log. or very close to it.

for R. Eng → sym log., use several of the modes of Eng. in parallel. Let T.M. decide which rule-type are best to use.

A serious prob.: My present idea is to start B. Q A. probs. in 3 parts. "① input x/l to ① and ② are ordinary

" Plain

.01: 738.40 ② is somewhat diffrnt, in that speed and low mem. use are also desired. We can, hwr, express ② as a separate induction prob. with a partic. "mode no.". It would be a TM_2-type prob. — ce to ↑ speed" of argn. search pgm.

Hwr., if we want to make Th. QA sdg. nonel., we have to have a unified goal here.

There are some implt. parts of Th. goal — like ⓐ Did TM really understand Th. Q? — i.e. was his xltn. into symb logic corr.
ⓑ Did he understand all of Th. data he used? ⓒ Did he answ. Th. Q completely? ⓓ It is likely that there are other params that tell how good a particular answ. is: — e.g. if we ask for Th. "best" way to do a certain thing, certainly Th. "°of goodness" of TM's response will have at least this addl. Param. — Note that for Q's involving "Th. best way" — usually such Q's involve a search, so we will usually have an inverse relationship betw ⓐ Th. total search time and ⓑ Th. °of goodness of Th. result of th search.

SN Actually, Eng. may not be v.g. to ask Q's of TM. with ambiguity because of its ambiguity. One could, hwr., ask TM. to state if there were any ambiguity in Th. input Q. — Or, just ask him to xlt: his internal version(s) of Th. Q. in to Eng. and give that as output.

Actually, Th. above problems are picky administrative. If an ambig Q or statement (where Th. ambig. probby is > a certain amt.) es in — TM. should ask about it. If TM is asked "best way ...", then clearly the prob. is ambiguous. L more — Like "Th. best way" with that can be foun such similar spec.

Th Mar 12, 64 — TMJ

Phan

.01: 739.to : As far as actual problems are concerned, there are ≥ kinds ≥ pro

1) Understanding Engo. ; MT ; Eng ⟷ symb. log.

A useful sub-problem is IR: i.e. we ask a Q in Engo. and TM replies with an answ. a/o the relevant docs. This means TM must xlt. all of its docs (or their abstracts) into

Def. S.L. (SL ≡ Symbolic Logical lang). Then it should, ideally be p.n. F.B. than is to PR. goodness of its answs. a/o a large corpus of "acceptable searches". This sort of data will enable TM to code docs in ways that are relevant to PR. "kinds of Q's asked".

2) Doing Phys, Math, sociology, Med. diagnosis, etc. problems Presumably this will be more diffl. than PR. 1st type of prob. - in that usually a person learns to solve PR. "Engo" prob. rather completely, but PR. 2nd type is never "completely" solved.

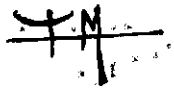
So: as I conceive of it now; QATM, (only 1 level.) would learn Eng ⟷ SL for both Q's and A's, by being gn. a set of examp (ETyp. sag) designed by me. Also a set of trial abss to be used in forming ops. to do PR. job. These ops. will be culled from all of PR. MT pgms. and long. models I know of.

Soln. of Math or Phys. probs. will initially be SL → SL, and will be initially fixed/pgmd by me. These will be search heuristics and will use New-Sim, GPS methods and any other I can think of.

So, ideally, at first, QATM will be able to ans (say), certain fields of Math, ← Engo → Engo. will be rather simple. Hvr., with a bi

TM Mar 12, 64 — TMJ

Plan



.01 This TM should be able to do Eng ↔ Russian with a skill that ↑ with time and corpus size. After TM learns some Eng ↔ Russ via SL, I can have it try to learn Eng ↔ Russ directly with only a corpus of Eng, Russ pairs. (for discourse analysis).

However, it would be a lot easier on me, if I didn't have to prepare this corpus of Eng ↔ SL pairs. I would much prefer giving TM a corpus of pure Eng., — then ask him to do .18 induction on it — Or just give him a corpus of data, with lots of correct Q-A pairs, and let him figure out the relation. In doing this, various logical manipulations will have to be done — .21 and perhaps TM will devise the equiv. of a SL to do this. — At any rate, we can, in another TM mode, get TM to learn to do math probs - (proofs, concrete probs, etc), — but in a formal language that I will have to devise. Then, in non-ol. QATM mode, TM should be able to work the math probs. in Eng. (both input and output).

Or — perhaps have .18 - .21, with Q's involving very simple logic at first — Then slowly introduce math probs. (in Eng) of progressively greater complexity.

A trouble here, is that by the time TM learns to do Q with any great skill (involving, hvr, no clever logical manipulation) TM will be, from a practical standpoint, "closed" to me — i.e. I will be unable to follow the mechanics of his computation in any useful way. As a result, it will be diff. for me to know just how to introduce Math ideas to TM. Ideally, I should be able to "tell" TM how to do probs — or I should be able to give him "s

Th Mar 12, 64 TMJ

Plan

01: 74.40. Perhaps "I can use th. other "modes" of PMTM for working math probs. in a simple notation, and hope that th. QA mode will "pick up" ideas from there.

It would seem that there is a very diff't. prob. of giving TM any "suggestions" after he has begun to get fairly complex on his own. Perhaps, I can use th. other modes to insert suggested hours, etc., by somehow getting TM to work certain probs. in those modes in ways that I think "of interest".

While I would want a QA Eng mode — I also want a mode in which th. Eng. is more exact.

One of my principal objections to th. trg. seq. of Eng ↔ S.L. MT is that it would be a lot of work for me to write th. trg. seq. However, suppose I started out by giving TM. Eng → SL and SL → Eng trg seqs., — Then I could get a Eng → Eng via S.L. trg. seq. i.e. TM was somehow forced to make a SL internal response, which I would not nec'ly look at. — Anyway th. Eng → Eng trg seq. would be easier for me to make after I had seen some of TM's, SL → Eng efforts — or after I had written some SL → Eng trg seq. for TM.

(Hvr., I might just use much of th. old Eng → SL, and reverse it, to become th. SL → Eng trg. seq.

Also I suspect TM's output Eng. will be fairly simplified at first.

e.g. John, has a house, . House, is red.

John has a house. The house is red.

has a red house.

Another trick: M
trg. seq. [E
than get s
Eng.

Plan

01: 742.40 Hvr: of basic import: I want to be able to convey to TM any heur ideas that I may have - on both a prob. solving level or a methodology level. A common way to do this is to tell TM one or more ways to work a gn. prob. I want this to be as easy as possl. for me. Also, it should be possl. in all cases in which I want to do this.

One way would be to have a special "heur. channel", in which I write down my "hints" for the soln. of any particular prob., in some (as yet to be defined) lang. TM_2 would learn to use this channel to help find solns. to probs.

Suppose that all of TM's probs are put in the form of getting the "most probable" or several "very probable" outputs for a gn. input. He does this by considering various ops. that express in-out relationships of the past, and wtg. those ops. "fitting in" a gn. I-O pair - i.e. find an op or set of ops that expresses that as well as all other known acceptable I-O pairs, becomes the main problem. It is a prob. for TM_2, hvr.

This is "Alan Kay's" Suggestion Box" channel idea sounds good! TM_2 would use it to bias his searches, and give the ideas in the Sug. box a priority of its past success.

One trouble may be the major big difference betw. the lang. in which I phrase my suggestions, and TM_2's lang. E.G. certain suggs. are meaningful only if TM works the relevant (s). a certain way.

Actually, for me to work on the problem of how to ... have to know in more detail just what ... and to some extent

M Mar 16, 64 TM's

Plans:

o.k. 743,40 : actual operations were. Also what its probs were and what hours. I wanted it to "learn" or rcv. from me.

Tentatively ②, ③. Typ. seq: ① Eng → SL; ② SL → Eng (or SL → Eng → Fr) MT via SL, but Typ'ing is w.o. SL. ②a Eng → Eng (or Eng → Fr) MT via SL, but Typ'ing is w.o. SL. ③ Text, Q ⇒ A (simple answ. in text). ④ same as ③, but small deductions in SL are necy. ⑤ IR : i.e. large texts TM must find all statements relevant to Th. Q. —

⑥ Does some simple math with input, output in SL. Use Q→A formats for (in, output). ⑦ Same as 6, but (in, output in Eng.

SN On 2nd Prot., TM's solns. of most probs. should at first be "understandable" to me, because they will involve only a few commonly used symbols. — i.e. They will be "conceptually simple". I could, actually, perhaps "learn along with TM." This might slow TM down some, but I would be in a far better position to trouble shoot, suggest hours, etc.! Also, it may improve my hours, etc.! I could shorten some of TM's search times by suggesting various solns. This would be a very good kind of work to do on-line, time shared.

So perhaps I could get TM to Th. pf. of not-too-bad Eng → SL — but Th. trouble here is ⓐ I don't know Th. complete sdn. to MT, and so I'm a bit wary of teaching TM to do rather poor MT — Th. hoping that eventually (especially w. a good TM₂), it would find some algorithms good enuf for fairly good MT (General)

However, I still don't know just how Th. "suppos. Bx" will work! — as to whether I can give suggs. in fact a form much useful to TM. In Th. case of MT, I can simply give possl. algorithms (E and TM will see how good they are — essentially, this reduces TM's search time. If I like, TM could for trial, even several examples past Th. suppos.

To Mar 17, 64 TMY

Plan

.01 : 744.40 : What to do: List various types of TM probs. and various types of suggestions, — Then see if I can devise a form of TM so that all of these probs. types and suggs. types can be taken care of (with min. work on my part)

① O.k. : well, consider one form of MT. in which Th. prob. is to devise a set of ops. (from basic component ops) → Th. observed I-O pairs can be obtained with min. p.cost. A ρ suggestion could be a sub-op. that I think useful — that I could define and perhaps give a priority with a certain apri. a hypocost (or just use TM's straight pcost of defining that op. — in which case Th. "suggs." would be in the form of a reordering of TM's trials to some extent)

Another type of sugg. close to this would be to simply try a certain op. (that I would derb.) for the total op."

② In "pure" Math: thrm. proving: Somehow, we get "free" to TM th. idea that he must make a list of a certain set of permissable symbols, that ∃, thru certain equiv. xfmns, reduce to Th. desired thrm.. Th. problem seems almost identical to Th. dcrn. production problem., except that in thrm. proving, one doesn't care about Th. p.cost., and there does not exist "standard" (tho not v.g.) solns for all probs. (i.e. one always has at least Th. identity or Barnoulli seq. dcrns for th. dcrn. productn. prob.).

This is a TM₂ problem. i.e. a "sort" of standard soln. exists (— i.e. an exhaustive search) that will solve "most" probs. that one encounters, and will solve all probs. that any finite Machine (e.g. hu can solve.

As a TM₂ prob., ∃ a sort of soln. i.e. Th. Newell, Simon s with whatever heurs they use.

Ideally, I should be able to take any heur that [POLI suggests, and insert it into Th. TM 2.

One Big addition to Th. New. Sim. method Th. "Chars." and "Methods" system

Tu Mar 17, 64 TMJ

Plan

.01 : 745.40 : SN A general "Meta-heur" : Whenever a problem is solved that takes "longer than expected" or seems unusual in some way, try to generalize. The method of soln., into an ~~afternoon for~~ "ob." for looking at a problem to tell whether it is of the type in which this "soln. type" can be used. The ob. can have either a deterministic or probistic output. Consistent use of this heur, and good generalizn, (within this meta-heur) will, almost inevitably lead to very great skill in prob. solving.

Actually, I think I can attribute just about all the skill I have at Sc, and Math, to the use of this meta-heur. Essentially, one does not "put a solved problem to rest" until one "understands" the soln. — And a big part of understanding the soln. is to know how to generalize it to be used in other probs.

One method to help generaln. is to try to apply the method of the present soln. to probs. of the past.

.22 : 745:40 direction is to create many new trial chars. and Method automatically — this in itself, may make the N. Sim. method extremely powerful. Another trick is to chose trials more carefully in accord with exact probistic analysis.

SN → Also similar to this is "Reading and understanding". At first, TM will simply code the input text into SL, and store it as such. However, after TM has been given many Q's, TM should code its input in much more useful (and probly more "compact") form. TM does not "understand" a fact, until he knows ① how it is related to other facts — i.e. how it is but a slight change" in other ② how to use this fact in answering Q's., formulating theories, etc. ~~too clear on ②~~

⇒ There are an ∞ of valid generalizns. of a given "method" to find a generalizn. that are (in view of applicable and unsolved probs. of the past) most likely to be useful in simple real-test of the Utility of a generalizn.

W Mar 18, '64 TMJ

Plan

.01: 746.40 very useful in solving probs. in Th. known past corpus — (tho there are certainly better, more complex methods of estimating Th. expected future Util. of a pgm. generally).

Note that there may be several genens. from a gn. soln. — each genen. in a diff. direction, a/o covering a different part of Th. sp.

Another kind of supp. for proofs: To supp. a sub-goal: In the case of Geometry, and certain other parts of math, a "diagram" can be drawn, to see if some of the subgoals are true. One can also test them with other kinds of "random" or otherwise "examples" that have been found to be "good test cases" for testing proposed theorems.

Hwr., I can't exactly see the pt. of this. Suggesting a sub-goal will reduce TM_1's search times, but will not help TM_2 — which is mainly what I'm interested in. Unless we want TM_2 to look at that successfully completed proof, so that it may gen. and → understand it.

One of the big reasons for my emph. of the QA mode, was that typ sags could be ordinary text book material.

Hwr., in a Thm proving or other Math prob. mode, I could have a typ sag. of Thms. and their proofs — nothing more! Similarly with Geom. construction probs. and "Find a number (entity) such that ..." type problems. Each kind of prob. could be a separate mode or "sub-mode" (different sub modes of Th. some with a strip of "connection" between them and different modes.)

So, one way to get the QA TM. to work Math prods — entry would be to get TM to do various types of math probs in an essentially SL notation for its inputs, outputs. In this form, it is easier for me to "insert" hours. Then express wish and have TM learn to do the nasty. Eng.

TM

Th Mar 19, 64

Plan

.01 : 747.40! Actually, I, myself don't have to put these proofs and various solns. to math probs. in SC form. I can hire grad students to do this. Also teach them how to use computer to check th. proofs. Perhaps pay them piece-work — $D per "step" of raw initial thrm.

.06 ⇒ TM's analysis of a proof that has been given: Tries to break proof down into sub-goals; with various methods to reach each sub-goal. Also, tries to find by a prip reason for each sub-goal, interms of correlations betw. each subgoal and "obs." that characterize the "state" of proof that might make such a sub-goal reasonable.

Essentially, after TM "understands" a proof, his abss. have been modified, new ones constructed and aprips changed in such ways that this proof is "obvious" in the sense that TM could construct for it that proof in a very short time (w.o. knowing the proof, but only having the newly modified proof params.) or some other proof that is even shorter.

Essentially, that is what I do, when I understand a proof. (Also, if we want th. generalizn. of 746.01 ff. — this is included to some extent in .06 ff, but not completely.)

Note that .06 ff applies to any kind of problem.

Note also that if I understand a soln. to a prob., I should be able to tell TM. this "understanding" so that he, too will henceforth be able to work such problems easily. This certainly is one major type of supp. that I'll want to be able to give to TM. - i.e. my "understanding".

Note: I can break down proofs into "understanding" units for TM to chew. Also other people can "exploit" proofs in diferent ways - and I can

NOTE! It may be that there is much of math in which proofs have not been formalized to the pt. that they are

E.G. in simple plane geom. the "proofs" later at. al. are probably not really

Th. Mar 19, 64

TM 8

Plan

:01:748.90 would be interesting to see just how they treated the problem of deciding when a reported "proof" was (to be regarded as) "acceptable".

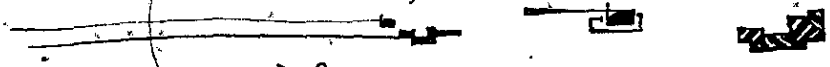
Well, OK, - say I have this TM that can do various math probs. (expressed in SL), and can do MT; Eng ↔ S and can do the first mentioned math probs. if expressed in Eng

— To what extent could such a TM answ. Q's. whose ~~answers~~ A's appear in the text, in various "depths"? — i.e. for Q's in which varying amts. of logic need be done on the ⇒ textual data.

SN) It may be ~~accepted~~ that this math "proof" ~~[illegible]~~, will be about the most diff. a prob that ~~[illegible]~~ exists for TM — in the sense of requiring new abss., and in the sense of having had the briefest humans work on it.

Another possibly very diff prob. - "General Science" — i.e. taking in lots of data from R.W. a/o Literature, and discovering regularities in it. Here, it may be that the diffy is assoc. with the huge amt. of data, and the diffy of finding the rite parts to "correlate" and ~~[illegible]~~ what functions of them to "correlate." (i.e. how to "correlate" them). From this pt. of view, the most diff't part of a science is to get it started — i.e. decide what the relevant variables are.

Hw'r, ~~What is even~~ how does this apply to psychology, medicine, Biology, Economics, Sociology, etc..?



Well — For simple Q's in which the A exists as a direct statement in the SL corpus (it need not be a direct statement in the Eng. corpus), all T.M. does is scan the SL backward (i.e. from t= now to t= -∞) looking for statements of the form. Finding one, it ~~[illegible]~~ translates it into English for them. Next in order of complexity, the Q involves a corpus. TM scans the SL corpus, looking

Plan

.01: 749.70 statements, ~~which~~ when it has found enuf, so it feels there is enuf info in them, it tries to xfm them into a form acceptable as an answ. to Q.

There are a lot of problems here: first of all, to construct obs. that will tell when a statement is relevant to an. Q. → To decide when a set of statements gathered from the SL corpus are likely to be adequate or inadequate in total info content to answ. Q

→ After a set of statements has been worked on awhile w.o. successfully xfmg them into an acceptable A:, at what pt. should TM begin looking for more data?

There are certain Q's in which TM can definitely say that ~~the~~ enuf relevant info. is not in the corpus.

:18 → After TM has seen many correct QA pairs, he will xfm incoming data as it comes in, and store it in a form → it is most easily used for answering expected future Q's. ||||| E.G. If he is told a story, he will store a plot of the story. Also, he will break the story down into chronological scenes, and store pictures of various characters as they develope. He will devise pictorial maps of the areas discussed etc. ~~All of~~ The utility of each of these activities is, however, contingent on what kinds of Q's are usually asked. TM shouldn't do these things if suitable Q's involving them are unlikely.

So, after a Q has been asked, TM will revise his method of storage and of "processing into as it comes in", in ways so as to minimize the expected time needed to answ. that Q (i.e. so that the answ. to that Q "be at the tip of TM's tongue").

There are many impt. Q's about reliability of various parts of the text corpus — also not. contradictory statements in

By "text" I mean info fed to QA TM other than the Q's. "Corpus" for QA TM I mean "Text" plus Q's

F Mar 20, 64 TMN

Phn

.01 : 750.40 : Along with this "simple" QATM, various standard IR techniques can be used to retrieve relevant info. After R. info is given in SL notation, we can use a simple "assoc. mem." to get statements in the SL context relevant to words in the SL Q. Also, we can categorize even the SL statements in various ways, depending on what kinds of Q's they are likely to be relevant to. — Apropos the methods of categorizing have to be continuously revised as soon as new types of Q's appear.

Note, however, that to use an assoc mem. best, the SL statements each of should be stored in several ways. It may be possible to store R. info. in sufficient no. and proper forms ⇒ an assoc. mem. is adequate for just about all Q's (← which is probably true for most Q's asked of humans).

The problem of suitably xfmg. R. relevant data (in the IR prob.), is the same as in Math probs, pretty much — except that here it is much easier, and can be done quite quickly and fairly reliably by humans. However, there is a continuum from the simplicity of the IR xfmns, to the complexity and difficulty of those required in Math problems.

O.K. — Now I have treated Math probs — both in SL and in Engl. Also, I've discussed "text readings" and simple Q answers about text. Now I'd like a TM that could read a math book and work the problems in the book, w.o. any other coaching on my part.

SN Remember the work I did at Dartmouth and the IR and followed several yrs.! I thot that I knew how to solve any Art. Intell. prob. — yet when I tried to apply my knowledge to this simple area learning, it became clear that my ideas weren't so clear! So perhaps it would be well for me to try a serious IR problem (preferably one that I'd want to solve eventually, and) indeed see if my ideas are adequate.

F Mar 20, 64 TM 8 200 people/city

Plan

.01 : 751.40 : : At any rate, I should continue my discn. of th. details of th. final PMTM — since such an understanding will help me decide which "demonstration" induction problem I should start on. Eng ↔ S.L. certainly looks good. Th. main trouble is that I don't have too good intuition about ethnic lang. processing.

Before working on that prob., I'd have to really examine th. lit., — both for theoretical work and for tapes, data sets, corpi, and/or dictionaries available.

One trouble is that ethnic langs seem to be terribly compl. I could just insert a bunch of fairly good model types, along with a "Universal expansion unit" (i.e. a set of instructions that make any op. possl.), and let it go on th. Eng → SL → MT problem, and see how it does. But it would be very diff for me to trouble-shoot it or give good suggestions.

Another poss. is to do other kinds of probs., and develop a v. g. TM2 (by BS, or open loop) before working on Ethnic langs.

.30 : 748.35 SN Note that many (if not all) of Polya's "heurs are "explains" in th. sense of 748.35 — so I can feed perh. all of them into TM easily!

Also I should use Malcolm Pivar's "Theorem IR system" for "associative" probly relevant thms. to th. thm. to be proved. This is close to th. method by humans — and it can improve much on Malcom's system using very good retrieval indices of progressively greater co

Plan

.01: 752.40: Well! It seems clear that it would be a lot of fun to w[ork] on various of th. modes of PMTM — (th. Theorem prover in particular since I have lots of my poward ideas for hours). Th. idea here, seems to be that I would expect to spend a great deal of time educating TM so that he has very many of my hour. tricks.

.07 Another approach mite be to make some sort of general purpose TM, and have him work on some field of prob. solving, then get th. BSTM aspect to work, so that he is very clever at th. TM2 level. Then we teach him to read - and - understand with minimum hours introduced on my part., but very long tap. seq. and perhaps very fast machine, very large mem., and taking very long time for searches at first.

In deciding on just what course to take (.01 or .07) Consider that in .01 I could hire various people to do various clearly-defined parts of th. work. Also consider that whatever I do, I'll probly have to start out with some fairly simple "pilot plant" study machine."

Also, whatever I do, I will want to have as clear as possl. a [picture] of th. final TM, - what it will do, how it will operate, etc. - I think this would be needed for either .01 or .07.

My intuitive preference for .01 is that I feel that "at the beginning" device will not work unless one makes it work, by brute intellectual force! Later, when, after many, many examples that lead on [to] believe it is O.K., one can "Let it go" and not "watch it [any] more"!

Plan

on 753.40 → Very Impt. Q: How much search (≡ time, memory) is equiv. to R. insertion of R. knowledge of certain regularities into TM.? I.E. w.o. certain knowl. of R. "outside world", TM will not dcvr. certain regularities very quickly. Ona could insert these regs. into TM or "tell" him about them. How much search time to dcvr. such regs. if we didn't tell TM? /// This Q is impt., since it will give us some idea as to how much info we have to insert into TM before it can begin to work probs. with reasonable speed. It will tell us how closely we have to "space" probs. in R. "Inp Seq".

SN Perhaps we can have some people xlt. some ordinary Math (a/o Physics?) texts in to S.L., for use as TM's Inp. seq. Then, after TM has learned this Math in SL, he should be able to learn to understand (or do MT) from R. original Engl. texts into S.L.

→ basic problem is to have some idea of R. amt. of inborn help in a human. Also, how much math have picked up from non-literature sources?

I will probably have to do a lot more "hand feeding" of hints to TM in various modes, since he will not have various "at birth" and "from R.W." hours that a human has — so I will have to compensate for this by more hand-fed hours.

SN After making a model of a special-purpose TM, for thm. proving, I can try to make a random-net model with analog "H-drum memory for connection strength".

Tue Mar 24, 64 TMX

Plan

01:754.40: Th. Q. of how 'separate' R. modes of PMTM should or must

It may be that there are an enormous no. of hours, peculiar to each R

that must be inserted into TM, or obtained by inordinately lengthy searc

— That no amount of general TM2 cleverness could compens

for this situation.

It would seem that speed and mem. size is inv. related to closeness of steps in Inp. seq. — Hvr., what about sample size

Can we use a very large samp. sz. to compensate for "closeness of steps of Inp. Seq.? This, presumably also involves a larger mem — but a "read only" (photographic) mem, a a slower + access mem.

Making a pilot special purpose TM could help answ. R above Q. Also, if TM could read Eng., it would be "cheaper" to give it a large sample — in most modes.

So: One thing that I'd like to learn: Convertabil rules betw. speed of "logic", mem. access speed, mem. size, "read-only" mem. size, speeds of various sections of mem., amt. and speed of input of corpus (≡ samp. size) — and — "rate of learning." The latter might be measured by R. time needed to achieve a certain "o of skill." The "o of skill" is meas. by R. ability to solve certain "essenti creative" probs. in a gn. time. — or, by the fact that in certain modes, TM has at least the same set of hours as a skillful man.

So: What I want to do now, is desrib various of the mps detailedly as poss. — with particular attention to R. most s., their forms, and how these hours are to be inser ld be nice if I could solve these probs. in ll modes — but at first, I will

TU Mar 24, 64

Plan

.01:45.40 R. modes individually and plan them individually. Later, I can try for a unified approach and see if it does, indeed, cover all of R. indiv. cases I've examined.

So far, I have a fairly good idea as to how R. fo/fo. modes would work:

1) Thm proving : SL input, output.

2) Find an object ∋ " : SL in, output.

3) MT : (Russ / Eng) → SL

SL → (Russ / Eng)

4) IR : Simple xfms on data to satisfy requests.

Eng input, Eng output. — or output is list of docs. or (list of "relevant" IP's.

5) Maybe some types of "word problems" in MaR. Input, Eng; output, Eng.

Looking over some randomly found Eng texts leads one to R. that Eng → SL MT is extremely diffl.! eg. Occasionally R. word seq. will not be s's and one must then decide on just what they can mean. It would seem that much text requires that one have a lot of know. of RW before one can get its "meaning" (≡ MT; Eng

Perhaps there should be an extra input channel here, → one can "tell" TM certain facts or probabilistic info. This would perhaps correspond to Don Bobrow's extra info chan TM's whose use is optional in solving R. prob. e.g. If a non-s seq. of words occures, that is a noun phrase, it is probly of something nearby.

Perhaps I am being too far to el. in my Q. A. t may be very desirable for TM — to fig kinds of Q's mean by being

TV Mar 29, 64 — TMJ

Plan

.01: 756.40 Q-A pairs. E.G., consider Pr. "Q": "What is Pr. book "Style is Langr." about?" In Pr. corpus is a book review of ~~Pr.~~ and various comments by reviewers, and Pr table of contents. — IM could give those or a part of them as an answ. If Pr. complete text were in Pr. corpus, ~~it's perfect~~ Pr. Q would be far

.08 → less clear. Perhaps an ideal answ. would be for TM to try to figure out why Pr. Q was asked, and look upon Pr. Q as an indication of Pr.'s state of Pr. "client" — then try to act so as to maximize likelihood of "satisfying" Pr.'s client.

The .08 is probly. one of Pr. best, least Pr. answs., consider more Pr. approaches in which we do want TM to induce Pr. "reasoning" of a Q. from its unity to other Q's and their "correct" A's.

→ What we want to do is not so much to use our (extra/chosen) to insert "facts" (756.30), but instead, (and in addition) insert "free" ops. that will make it likely that TM will form Pr. proper inductions from other, related, Q-A's. This latter is much better, because when we insert an inductive device", this is equiv. to inserting many, many "facts" — and also, TM automatically evaluates Pr. "inductive device" optimumly — which he cannot (ordinarily) do with a "God-given-fact" which he must accept at 100% accuracy (tho we can make safeguards, so if a "fact" becomes less and less likely in view of TM's corpus, he can eventually drop it — i.e. a "fact" would be simply a statement with unusually high apriori and aprip wt.)

Plan

.01: 757.40: Some EXAMPLES of such inductive "inserts".

1). See Pr. Q of 757.01: Say Pr. corpus contain reviews: contents and complete text. Pr. decision as to what TM will put out, depends on previous A's to ~ Q's. If just Pr. reviews, were ~~it~~ O.K. baton, he will give them only. A b reply would be for TM to ~~ask~~ detrib. how much info he has on Pr. book and ask client for a narrower spec. in Pr. Q

2) "Why does most wood burn with an orange flame" Here Pr. meanin of a "why" Q is ~~almost~~ rarely if ever, unambig. Hmr., Pr. "me will have to be induced from other ~ Q's. In this case, t kind of meaning we'd like is: What facts and deduc a/o inductive trains would lead to Pr. "fact" that most wood burns with an orange flame"? ~~the most~~

We must insert ops. into TM ⇒ such a possl. induc on Pr. basis of Pr. corpus it has, is a ~~reason~~ hy proset (with its proper a cost) We can ~~be~~ put in this op./, and ask TM to search for a good inductive soln. — or, we can terminate Pr. searc immediately, by ~~giving~~ TM Pr. answ. [we will, hmr., ask for Pr. proset proposed "answ." to see if indeed, reasonable.]

Q-A

SN. In general, TM's soln. to an induction problem will be an op. that tells how it went from the Q to This may be an op. that has been "consi" (i.e. has worked) for all Q A's up to now. This op. will have a certain known poset, and it is TM's work to find a better op. that is also "consi up" Note that such an op. can include correction elements in its de so an op. that is not "consi up to now" can be made so, adjunction of suitable info.

→ I think that it should be possl. to "explain" to ~~is~~ verbal Q A probs (i.e. in Engl) very much like ~~from~~ proving (748.06). This is very impor

Tu Mar 24, 64

TJMX

Plan

.01:758.40: to get TM to do Eng. QA's with any real facility

In general, it should be possl. to explain to TM our methods for solving any prob. that we can solve. Th. meaning of "explain" is as 748.06. Also, we may have to give additional statistical probl data to show that Th. "explaining" we have gin. is, indeed an expl — i.e. that it results in a dcrn. that ↓ rcost (in some sense). This can be done by giving lots of probs. in which Th. abss. used in Th. of new prob., are also of much utility for dcrn. Or we can ha a special device that enables us to simply tell how many times bator, Th. abs. has been used in Th. corpus — thus. Th. trouble with that is that we then tend to forget info about Th. correln. of use of one abs. with Th. use of another. So, Th. use of real examples should be employed whenever possl.

Th. big problem here is how much of my mental proces in prob. solving can I explicate to TM? In math, I can perhaps do much. In language analysis - perhaps much less. Of prime importance — I don't know how much of Th. prob. solving is deeply subconcious. All I can do is put into TM my conscious ideas on heurs, and hope that Th. ideas that TM develops himself will be good enuf to do what my ~~unconc. mi~~ sub-conc. mind d

One thing I have no idea of: How much search is need for a "maximly creative" idea? If pcost is $< 10^{-10}$, clearly I will need some sort of // computer for searching. Logic cults can ope at 10^{-7} sec. w.o. trouble — but I will need a small // very fast focal memory for units operating in // (say a flip-flop or capacitor memory). Say 10^{-6} sec/trial, and 103 units opera So. pcost = 10^{-10} would take 10 sec.; $p \neq 10^{-13}$ would take 10 Along with Th. very fast mem., one might want a slower mem. for mem. to tell it what Th. present problem is. Also, a very r mem. be used for tables

did get a pcost figure in ZTB 143 of

(p. 43 of ZTB?)

Phan

.01:759.40! We can reduce Th. / trials ~~to within below~~ by a factor of 20 if we ~~[redacted]~~ search in *pure* order of probby, and we get a factor of maybe 50, if we know Th. rite symbol probys. Re ZTB, I got it down to ~ 10^7 trials. With only 1 arith. unit and 100 μs/trial — this is 1000 sec, or 17 min. of machine time. Modern machines can multiply and add in ~ 2 μs. so this seems like a reasonable order of magnitude.

for 1000 arith units operating on 11, we have a pseudo random no. ~~[redacted]~~ that gives each unit a difrnt no. ~~[redacted]~~ for every trial — so that no 2 units ever make Th. same trial. (these p.r. nos derb. each trial-to-be-made.)

Th. present Q's: (1) I'd like a more detailed dcon. of Th. methods by which TM1 and TM2 do proofs. — using all Th. hours I can think of — i.e. just how do I insert ~~[redacted]~~ these hours? (2) How, e.g. would all of my ideas on how to do arith. evaln., be applied to a prob. like ZTB 193?

→ (3) How can I use all of my hours for probs. expressed in Eng and similar "non-math" probs? (i.e. like 758.37).

Th. basic idea is that if TM were a human, we could [redacted] he would have certain built-in hours, and these would be of the type for a typ. seq. that a child normally gets from his parents. But, we don't know what those hours are, so we will try to simulate their effects, by making sure that TM has at least Th. hours I am conscious of, as well as a complete [redacted] so there is at least Th. possy of dcrng. any derbable hr.

There always will be Th. possy. that humans have some de subconcious hours, that are very impt. for certain directions of activity, and that these hours are "too far away." ed. by any typ. seq. that we would think

This is Th. "[redacted]" Premise of M

Plan

.01! 760.40 ! So ! what I'll probly do is first work on a "pilot study" for a while, to get an idea as to what various types of hour look like — whether they're of Pr. TM, or T label — whether they can be unified into a single sim form, etc. Also, to get practice in explicating my own "intuitive" hours — since a linguistic TM = will be very diff(t, and practice in explication in an easier problem field will probly help me much.

Thrm. proving (or arith. argm. ⇒ than eq. solving, than integration sym.

may be Pr. first pilot study.

Hvr., I think I should stay at Pr. "intuitive level" in planning as long as possl. (i.e. until I run into * probs. that have solns. that depend, essentially on "details of method"). The reason is that this makes it likely that my eventual detailed method will stick closely to my intuitive one.

SN For "Eng → SL learning": I think Pendergraft has a large corpus of parsed Eng. S's. If we taught TM parsing first, using that corpus (and explaining whenever necy), it would be than possl. for it to learn Eng from Pr. already parsed SS. including "Discourse A

30 → Rite now, re: Eng., I'm thinking of looking at Pr. variou parsed (by TM) Eng. SS along with their SL xltns., and trying to devise "rules" for TM to do th. xltn to SL from Pr. parse

So I im fed pairs of (parsed Eng. S., SL xltn.). F see if TM's "rule" as it is, will do Pr. xltn properly not, I look at just what TM did, and why he fail a change a/p addition in TM's "O.P", so Pr Pr. new pair, as well as all P

W Mar 25, 64 +MJ

Plan

Corr 761.40: After many data pairs, What I end up with is a very lengthy operator dcrn. I try to reduce its length by making suitable defs., and noting various regularities. With the resultant abbreviated operator code TM can then use the component symbols in "random combinations" to try to make "corrections" to the old op., so that the new corpus data pair "fits" it.

(This would seem to amount to a major linguistic creativity)

Actually, in making up these "rules", I would try to reduce complexity by making up defns. as I went along.

"Back-tracking": My impression is that if a particular portion of the total op. doesn't always work after a certain pt. in the corpus, then one should devise an ob to recognize the new situations, and make a separate sub-op to deal with it in the new way. Later, the old and new sub-ops may be integrated in some way.

This sort of situation will be very impt. in the ab method of dealing w. linguistic data.

The above method of analysis will enable me to put lots of my "extra linguistic" knowledge into TM.

After a reasonable corpus of (parsed Eng, SL) pairs, TM should be able to devise new trial rules with sufficient skill, so that only occasionally will human intervention be necessary — i.e. let TM run a search for new "consistent" rules — and only if the search exceeds some limit (say), will TM drop that search, and go on to the next (pars. Eng, S.L.) pair.

You can look at the troublesome pairs

W Mar 25, 64.

Plan

.01: 762.40: For Rx. stuff in Rx. list Π to work, I may. have to [illegible] some fairly good TM's.

After TM has gotten fairly good at (Eng → parsed and (parsed Eng → S.L.) and (S.L. → Russ) ?? (which is pretty easy), we can put in a corpus of (Eng, Russ) pairs, and let TM try to do this by making Rx. intermediate SL s's when necy. I think that TM should also know (Russ → SL) and equiv. xfmns for SL → S so it can tell if an Eng. and Russ s are equiv.; if they are equiv. to SL s's that are equiv. to

If we can use a (Eng, Russ) corpus, to can obtain a very large corpus w.o. much labor and TM will learn lots from it if he has to do the SL intermed. step.

Later, we can give TM a (Eng, Russ) corpus that is Π → Π xltn. This is a better check on TM's skill. Also, we must often look at TM's SL intermediate to be sure he "understands" — The MT of Π → Π is a fairly good check of this —

For SL → Russ, say — for discourse, we can stipulate which statements of Rx. SL corpus we want integrated into a single S. This is impt. for proper "style" — TM's. Russ (or Eng.) is to be "readable" by a human. We will have to control TM's "style" in other ways also, if he is to have much ling. output, — (e.g. for IR) otherwise it will be too much of a drag to read his Eng. output.

In fact, TM could be lots of

Plan

.01:76.3.40: could have TM have a sense of humor — He could have a very large set of jokes and funny stories that he will tell when they seem related.

→ Also, I could probly get TM to actually create jokes! — But I would have to do a careful study of "humor" first. This is a project that I've want to do for some time. It could be closely related

---

the use of TM as a teaching machine, since we will w a model of the "client" within TM. For jokes, hwr, we will want a ~~general purpose~~ model of an "average humo to some extent — while for teaching, we want a more s specific model.

In jokes, I think what we do is lead the person a certain direction; then we switch away into some oth direction. If the end result is pleasant for the client to contemplate (or at least some aspect of it is), then it will be a "joke".

Also, related to jokes are Questions of certain k Since they are very ambig., and the real Q is — "How c I use this Q to get an idea as to what reply would satisfy the client"? — This requires a model of the client to some extent.

To return to the main line — linguistics - MT:

the reason that the process of 758.37 and 761.30 (≡ PL linguistic rea is so much more difficult for me to do than ≈ 748.06 ← proof teachi In PP I myself do induction when I deer a of this is conscious, and I just tell TM how PL, hwr, the induction has occured many yrs

Thurs Mar 26, 64 — TMY

Plan

.01: 765.40: Want to start TM out on simple things, and then work up to more complex ones. A sort of Tng seq:

1) (Eng → Parsed Eng) pairs.
2) (Parsed Eng → SL) pairs. Simple ss; no "discourse analy".
3) like 2) but coupling betw. ss's ("discourse analy")
4) More complex s's.
5) (Eng → SL) s pairs
6) typographical errors — words missing, misspelled — } corrected by local context
7) Grammatical errors. } corrected by local context
8) Probabilistic statements introduced in SL. English text like "It will probly. rain tonite".
9) Connotative meanings, in Eng → Problistic statements in SL
10)

.25

We would like TM to be able to read a modern novel and then be able to Answ. Q's about various of the chars, even if they were described in the novel in a very "figure of speech-ish" way. We might as a tng. seq., ask Q's (and Ans. them) about various "facts" soon after they are introduced in the text relevant to them, & even as

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.30 → What about a channel in TM (Eng. or SL) in which one can tell TM things? Say usually of a meta factual nature telling TM how to do things (info for TM2), or general facts about RW, — on how to interpret (into SL) various kinds of text — e.g. how to deal with hyperbole and various other figs. of speech. Hopefully, one might even use this channel to outline ideas for possl. proofs of Rrms.

I think such a channel would have to be used by TM2 if it would be used: If Eng., it would be first x'lted & then would Rman, empirically, find that such info could help Rm finding of proofs. Perhaps such [illegible] ordinary part of Rm cor[illegible]

F Mar 27, 64

TM8

Plan

.01: 766.40: a special way. TM_2 would then have to "discover" (with m
that "R. parts" of R. corpus labeled in this way could be used t
speed up R. find type of proofs.

We could, e.g. have TM read Polya's "__s on problems"
and he would then find that this part of R. corp, also, could b
used in this special way.

SN Ah! [redacted] Easy way to get SL → [redacted] Russ ↔ SL
Say TM knows Eng → SL MT. Then just [redacted] to pr
a [Eng_i ↔ Russ_i] corpus, get TM to produce corresp.
[Eng_i ↔ SL_i] corpus — then just use R. rest of equiv.
[Russ_i ↔ [redacted] SL_i] corpus. In this way, it will be
easy to get [redacted] [(Lang_j)_i ↔ SL_i] corpi for any Lang_j

Say we have a list of ss in Eng. for [redacted] SL
typ. seq. After TM has satisfactorily learned R., it is
then likely that our ordered list of Eng ss, (pretty p
list of
so — have a human x/tr. use R. sample Eng ss, and x/t
it into Lang_j, to make R. Lang_j ↔ SL typ. seq.

Perhaps we could use this special channel to prevent
certain kinds of "undesirable behavior" by TM - like
trying to control R. client, directly or indirectly. One must, h
be sure that such an input would not simply be used as a
hint that such control was, indeed, possible, with a hy
probty. ("Don't throw me into the briar patch, Mr. McGregor!")

.37 My present idea for Eng → SL MT "learning":
Eng.
start out with simple ss like: Dick is a boy. Dick
[redacted] The ball rolls. Dick has the ball. Dick
[redacted] gradually introduce new parts of speech

F Mar 27, 64 TMJ 7

Plan

.01:767.40! simple adv.] — greater compl. ity (verb phrase
short noun phrases, pronouns), etc.

Normally, I give TM R. L. x(t)n., and also
him R. relevant new rule, if necy. (i.e., I first ask hi
to try his old rules on R. Eng. input to see if they
are adequate. If not, I ask him to find a hy. appr
rule that will give "correct" SL. (also has
gen. rules for equivalence of SL exprs.).

If TM can't find such a rule in a reasonable time, I
will give him a hint, or actually the relevant ru
When I've done so, TM will try on R. latest
example — to see if my rule works. If it does,
he will then see if R. rule changes any previous
MTs he has done. If so, he will show them
to me, giving R. methods by which the
MT of those cases were done before and after
R. new rule was introduced. From this I can see
what's wrong with my sugg. new rule.

For more complex ss, I wonder if it would be
advisable to try to do R. (Eng → SL) MT in 2 steps,
i.e. learn parsing Eng.'s, then → SL. Then I could
Pendergrafts corpus of parsed ss.

1132 Another kind of Eng. sug. that might be easier
directly to fairly difficult text, and try to write out
what seem to be my own rules for Eng → SL. This
way, I will avoid making rules that have to be changed (as
(which would occure if I started out with simple ss and
more complex ones). The unfort. part, however, is that
proach, it is unlikely that TM would be
tion until the Eng. sug. was rather

Plan.

.01: 768.40 done a lot of work to try to simplify th. total structure of th.

→ SN This idea of going over th. operation of th. proposed TM at a "very hy level" is a very good idea

I may want to decide betw. (th. Eng → SL ~~=~~ MT appr. of 768.01) and (that with th. typ. seq. of gradual complexity) after I have studied both in detail a bit (or ~~—~~ ed both a little

My present direction of ideas: I want to love this

.10 Eng → SL idea a bit far — then I want to what sort of typ-seq. and inductions TM will need in order to get a "real understanding" of RW. — e.g. to be able understand th. signif. (and ∴ "meaning") of "God is Love". & th. metaphors

.19 and figs. of speech of 765.10 ff.

.20 One way to do a lot of this (at first) would be by way of extra chapters of 766.30. I could explain to TM, th. signif. of "Go" as used in Lit. — how metaphors and exaggeration was used in Lit., etc. Eventually, hwr, I would want TM to be able to produce (a) sort of thing w.o. being specifically told; since I can't tell TM about all (peculiar) things that will occure in his readings. What I could do would be, whenever I "tell" TM anything ("like about God"), I should also tell him how he could have (with long and short time s/o with special "free" definitions) induced this from th. corpus that he has (or will have — since TM could induce nothing from th. first occurance of th. word "God" — or even from 3 or 4 occurences).

→ Another thing: If TM runs up against trouble, and can no reasonably good meanings for a word or idea (even if has occured several times in th. corpus), it ma about it.

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01:769.40 This "idea of God" idea is useful, in that it makes it clear that each input to TM would have to be labeled as to the source of the info. This way, TM would know whether certain writings were by A. Einstein Billy Gra[ham], a [illegible], Reader's digest, a novel by Lawrence Durrell, or m[ore] or direct input of TM's own sensors, or the U.S. Edition on "God or physics" [illegible]. Also, the data of the writings and any other data should be included, so TM can make estimates as to its relevance to various fields and its "accuracy" — (tho the meaning of "accuracy" would have to be properly defined.)

→ One way for TM to get an all other picture of the world would be by reading novels and practically any literature, and trying to find the redundancy of this lit., by finding "regularities" in it. I, of course, could suggest and give it (via "free" defns) TM many "regularities". Note that this is then superficially difft. from QA TM. Actually, I don't think it is difficult. In predicting using the entire QA corpus, it is in general easy (for optimum predn.) to find all regularities in the "text" part, as well as answer Q's.

→ The interesting thing about the A's to the Q's is that the A's are (relatively) extremely redundant region of the corpus since one can predict them fairly well from the rest of the corpus. So I think Q's and A's will still be useful in helping TM find regularities in the corpus. (this attention to what I believe are important regularities in the corpus is the above looks very good.) This looking for regularities in the text is the sort of thing I had in mind for a truly clever TM. Most, if not all, of the "interpretations" (on the extra channel) that I was planning for TM on 769 to ff would could then be put into the form of "regularities to look for in the text" — rather than "[illegible]s" about RW".

Then is — just what sort of Inp. seq. and

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.01:770.40 I use to get TM to th. pt. of being able to perform like 5/69.10-

In th. QA corpus, th. use of SL expressns as an x/ of th. entire corpus, is but a particular kind of regularity rev i.e. in this "recoding" of th. corpus, th. regularities are more readi observed — that's all. So th. SL M is certainly n necy, but only a sugg. heur. device. (Hyp. it may be also v.g. for I

In recoding th. corpus, there appears to be 3 (probly related) fact determining th. form of th. code:

1) Desire for min. code (≡ max redundance)

2) Use in IR [redacted] — use of index terms, etc

(This is done, I believe, for TM2's problems).

→ An impt. related Q, then: What is th. relationship betw

① "understanding" a text (e.g. like a recoding into SL, containing about all info in th. text), and ② min. coding of th text for optimum induction, and ③ recoding of th. text for opt. IR. ?

Well: th. recoding of ① that I was thinking of makes at least th. assumption that no Q's will be asked about th. verbatim word seq. of th. original text. Ideally, TM should store both th. original text and th. SL xltn. Better yet, th. text could be recoded for IR on using index terms based on probabilistic analy of previous Q's. Then when a new Q is asked, th. index terms are used to retrieve th. relevant parts of th. text — which is then given a more com xltn into SL. → 772.34

.34

SN I think th. basic idea of my TM thg. pgm: Every ti give TM a Q & tell him th. proper A, I also tell h could have induced th. A, and I give him enuf ex at he could have legitly done so. Then to hm a very similar Q, → he should