Semester Projects for AI, Spring 2015, IITJ

1. *Intelligent Program editor* with features selection for programs, syntax chcking for types, variable names, expression checks, and others as you type.
2. *Information extraction* from text, for example, for the query "Where is Tajmahal?", the reply should come as Agra or India.
3. *Question answering* for the given collection of texts.
4. Desig and implement the *Turing test, for a program* to behave as a "Child of class V", "A farmer", "A politician", "A Director of a College", "A vegetable vender", "A begger", "A monk". Each separate project.
5. Design and create a *micro-Facebook*.
6. Design and create a *micro-twitter*.
7. Design and create a *micro-linkedin*.
8. Design and create an indexer for inverse-trees, to be used for *search engine*.
9. Design and create a *general search engine to search* documents from ditributed urls.
10. Design and create a special purpose search engine: for searching the the documents only for AI.
11. *Spam filter*: Filter the spam mail. Transfer the mail file into a text file, and check specific signature / identity, based on this, route the mail text to the folders: bad / good.
12. *Intrusion detector*: To check if some one has intuded in the network or not. For this save the acitivity / history files (log files) and search specific patterns. The output shall be the time, date, and IP from which intrusion has taken place. You need to distinguish the bad v/s good IP.
13. *Virus signature detector:* To look for specific signature / patterns in the files, apply the baysian probability (conditional probability: if condition the so and so virus (cause-effect)) to find patterns of viruses.

14. *Speech recognition:* That is convert sound speech into text speech. For this convert sound into phones, phones into phonems, phonems into characters (english), and assemble characters into words. You may some python tools for this.

15. TTS (*Text to speech conversion*). Keep the words set W and corresponding soundset S (wav files) in a table. For a given text T, an algorithm will search $t \in$T in W and matching $s \in$S will be output. The program can be written in python, to have better symbol manipulation capability. The other improvments, like pauses for punctuation marks, and words not in table can be considered.

16. *Expert system for medical diagnosis.*

17. *Expert system for Computer hardware trouble shooting.*

18. Expert system for medical diagnosis (only a select type of diseases may be considered, for example water born diseases / diseases which are transmitted through breating air, like cough, etc,)

19. Game playing (any of the checker games)

20. Planning of class time table.

21. Scheduling of flights.

22. Scheduling of Trains.

23. Implement the Turing test (Immitation game)

24. Computer v/s human Chess game.

25. Computer v/s human Tic-Tac-Toi.

26. Computer v/s human Sudoku game.

27. Robot simulation for path tracing.

28. Automated vehicle navigation.

Note:

1. The group partners shall submit a synopsis in pdf, by ***22nd Jan***., in 2-3 pages, online.

2. The language for coding shall be prolog, if necessary. (for logic) (for text filtering python can be used)

3. In the case of odd number of students in the class, the last group can be of 3 or 1 students, depending on the magnitude of work.

4. These project are aimed for theorical study. Hence, the object is to describe what approach you will use, what are the models, what is mathematics involed, what are and why are so and so algorithms used, what is efficiency of your systems in respect of time (complexity), why the method you have proposed is better alternative, and so on.

How to?

These projects shall be in the form of small reports, describing how you will solve (i.e., solution approach), what/which methods, algorithms, techniques of representation you will use? The aim is to write the things out of your brain- and not from the web or book. Also, to discuss what benefits will be gained by the end user, and what are the potential applications?

It will be required to prepare and submit a report, comprising the
Title
Objective the project,
Motivation,
Theory
Implementation details,
Block diagrams,
Alogorithms,
Conclusions and improvements
Bibliography

Each project shall be 15-20 pages, edited in sections names given above making use of Latex/Lyx only.