SEMESTER   FIFTH

COURSE   AI IN SOFTWARE ENGINEERING (3+0)

COURSE   CODE   509

COURSE   INSTRUCTOR

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Chapter 01

Intelligence

Ability to solve the problem. i.e :- behaviour, learning ability, action, things imploment.

Artificial Intelligence (AI)

AI based applications
i.e:- sensor of traffic lights

deeblue
1st application

Domain knowledge => Domain expert

National language processing (NLP)

Anything we do $\Rightarrow$ Intelligence and

when mechaine can do $\Rightarrow$ Artificial
Intelligence (AI)

Allen turny (father of Comp. Sci)
1956, the terms introduce
artificial intelligence.

Evolution $\Leftrightarrow$ تطور)

many dimensiono / fields in AI

Artificial Intelligence in modren
approach
Rumel norvick Book

Lecture 02 (Tues)   Feb 28, 23

                                                   google classroom
        Artificial   Intelligence   in
    the   school   of   though   code: gmcdnkp

1- Thinking   like   a   human

              How   to   simulate   a   human   being

        Artificial   Nural   Network

2   Acting   Like   a   human → Alan Turing

        Alan   turing   say   the   machine
    can   be   intelegent   in   the.   1950's
    for   the   first   time   and
    the   He   proved   of   his
    experiment.

3- Thinking   Rationally
                         right   way   of   thinking

    03

Rational thinking require reasoning.

How to built logic

logics

-) fuzzey logic
-) Boolean logics
-) Proportional logic
-) Predicted logic

This is called the reasoning

Aristotal اسطبل
laws of thought

Describe the logic of the formally.

Expert system / application

04

4- Acting   Rationally

          believer   in   rational   agent

                                        is   anything   which
                                        proceed   input
  Rational   agent   from   the   environment
  Optimally   achieved   &   act   accordingly
              goal
              ∧

       explicit   On   Implicit

    See   outcome   &   maximize   utility

05

Agents is anything which precious input (percepts) from environment and act acoordinly.

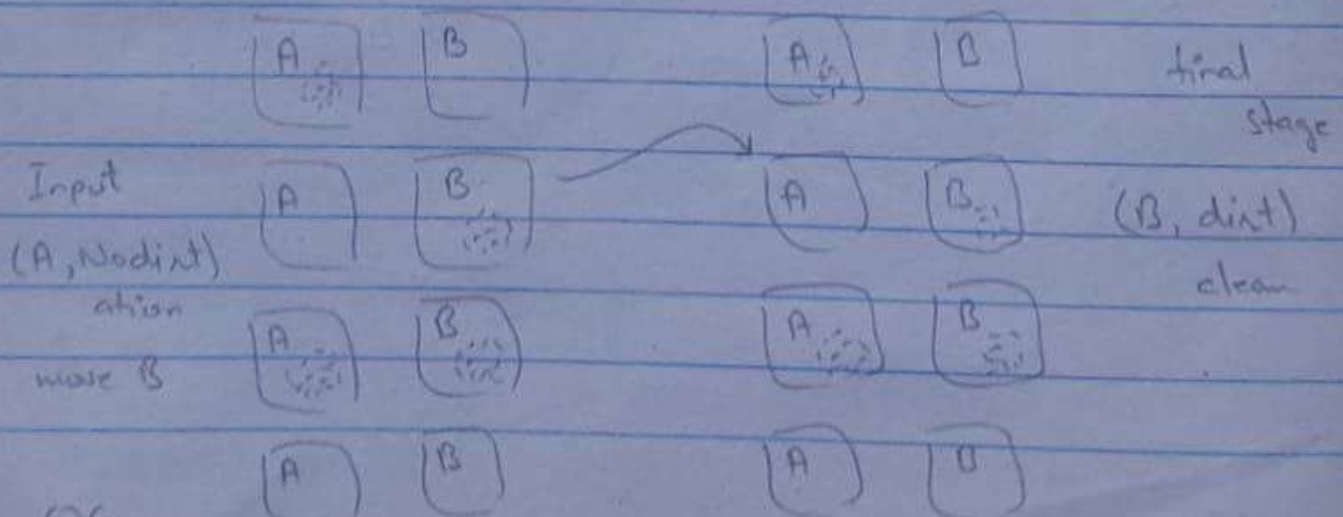PEAS   ⌐→ Performance measure
⌐→ environment   ⌐→ Actuators   ⌐→ Sensors

Moduling

→ Example :-   Eight possible
initial state   world

VCA (Vaccum cleaner Agent)

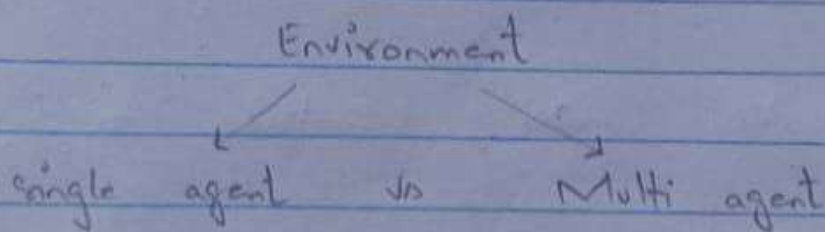|				
[A]	[B]		[A]	[B]	final stage
Input [A]	[B]		[A]	[B]	(B, dirt) clean
(A, Nodirt) ation					
[A]	[B]		[A]	[B]	
more B					
[A]	[B]		[A]	[B]	

06

This problem in Determinestic problem known as state space

spot the all areas in known as state space graph.

Environment

Discate vs Continears
eg: phone game   eg: football, driving

Dengerous (non-Obserbal)
environment

Environment

single agent vs Multi agent
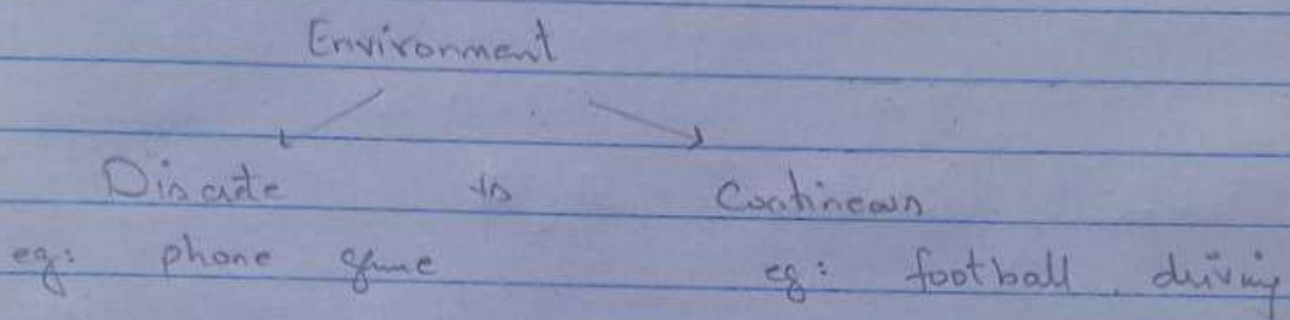
fully Obserbal vs partially obserbal

07

Problastic   vs   stochastic

                                           probabity vary
                                with   time   eg:
Static   vs   dynamic   traffic   at   4pm   etc

(stand still)   (changes)
eg: chen yune   eg: road / football.

    Trafic   Controller   Agent

PEAS   no deadlocks
                         Efficiency   management   on   optimal
                 measure
Performance   : time   of   the   agent   is
                           quiekly.

Environment :   road,   zebbra   crossing, vihicles

Actuators : signal   Lights   (Control   to   light)

Sensors : frequency   identify

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PEAS of un mand vehicles

Performance measure : save driving No
traffic rule violation / accurate speed.

Environment : road , vehicle , zebbra
crossing.

Actuators : staring , break

Sensors : Distance , optical break
sensor , infrared camera

Agents deal in fixed environment

Typa of Agents (Next clan)

Agent   types   .

.-   Simple   reflex   agent   (Sences)
.-   Model   Based   reflex   agent
.-   Goal   based   agent
.-   Utility   Based   agent
.-   Learning   based   agent

improvement   complex   environment
update   knowledge   based

Utility   quantitat
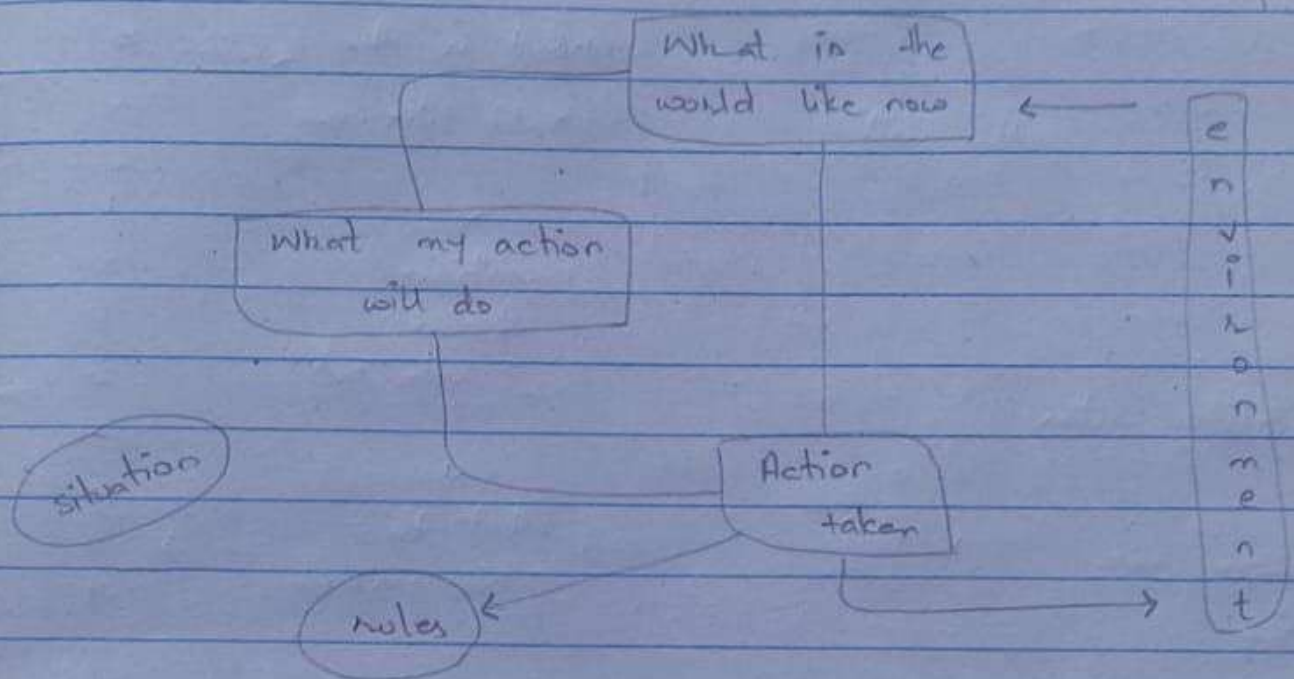ive

reflex   action

state space

(known)

Agent

Model Based

world = states

Percept

Problem imp state

.— Initial state
.— Goal formation / test

- Implicit goal.
- Explicit goal.

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Example

7	6	5
4	3	2
1	0	

goal

Simple   reflex

Agent   Percept

path cost

What is the world like now

condition
action
rule set

What to action perform

Utility rules

2	7	3
6	0	1
4	5	

change every time

e
n
v
i
r
o
n
m
e
n
t

critic

Problem solving

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Lecture 05 (Tues)   May 02, 23
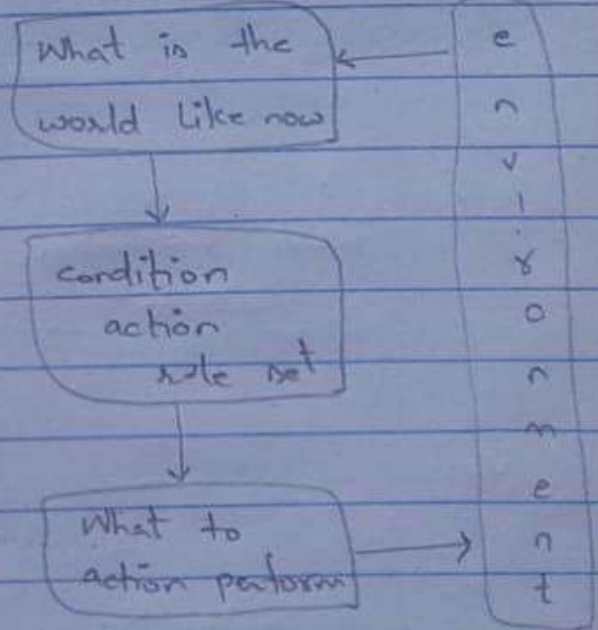
   Chapter no 07, 08, & 09

                                                         Aristotle
                 Logical   Agents   represent a
                                                             logic

logic (reasoning)
       is   a   language   →   formation

   two types
                    Syntax   Semantics

   How you   create   How you   interpreted
         syntaxes   the   syntaxs

                                         Or
   facts / rules   Meaning   of
   build   in   the   system   Sentense

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KB (knowledge based)

- Domain specific knowledge
- Inference engine

first form of logic

Propositional form of logic

symbols ; P, Q, R, S   7 bi condional

<=>, ∧, ∨, 7, =>

                              P => Q
left ∆ right

                          True   False
                          ⌣____↓____
                              False

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Pomible   modler   Or   Pomible
World   Or   pomibilities

Symbol   grows   model 2^n

7   symbol $\Rightarrow$ model 2^7

Grid

1,4	2,4	3,4	4,4
1,3 W	2,3 W?	3,3	4,3
1,2 A s	2,2 A s	3,2 W?	4,2
↑ 1,1 A →	2,1 A(B)	3,1 P?	4,1

Agent task to travel and
caught the
treasure

Pito نار   Breeze (Pits)

            بو

wumpus   Adjacent

Smell (wumpus)

PEAS   Input   precepts   glitter
                                            (tresure)

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$\{(1,1) , \neg B , \neg S , \neg G\}$ $1+1+1+1+1$

$7 (No')$

$\{(2,1) , B , \neg S , \neg G\}$

$\{(1,2) , \neg B , \neg G , S\}$

$\{(2,2) , \neg B , S , \neg G\} \Rightarrow$ Risk   50%   50%.

There   is   a   pit   in $(3, 1) \Rightarrow P_{(3,1)}$

$P_{(2,2)} \qquad \lor \qquad P_{(3,1)}$

$B_{(2,2)} \Rightarrow P_{(2,2)} \lor P_{(3,1)}$

$S_{(1,2)} \Rightarrow W_{(2,2)} \lor W_{(1,3)}$

$P_{(3,1)}$

$\neg P_{(1,1)}$

Use   5   distinct   symbols

$2^5 = 32$

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Artificial Intelligence (AI)

Ability to think / learn + form decision or opinion.

(udacity website)

think like human

Act like human

think rational   Act rational

Artificial Intelligence

Types of Agents

P	Performance
E	Environment
A	Act
S	Sensor

Simple Reflex
Agent

if else
change occure

Model based Reflex agent

maintain history + Simple reflex agent

Generative AI based model

Goal based reflex agent

Modren world

learning based agent

agent means feed or define

Chp # 02

Types of Environment

Environment Types