Errata for PhD thesis:
“Petri nets for Situation Recognition”
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Incorrect statements and clarifications

- p. 8, last paragraph, fourth sentence
  - To say that genetic algorithms consist of searching is misleading. The sentence should be rephrased: “Genetic algorithms are inspired by evolution in nature and are used to search for promising solutions by evolving a population of candidate solutions over a number of generations using a set of genetic operators.”

- p. 59, caption of figure 3.3
  - The caption should be extended to be more explanatory. The following should be added: “The state of the automaton is initially $S_0$. Assume an input string consisting of 011010. When observing the first 0, the FSA moves to $S_1$. After reading 01, the FSA moves to $S_2$. After reading 011, the FSA returns to $S_0$. After reading 0111, the FSA remains in $S_0$. After reading 01110, the FSA moves to $S_1$. After reading 011101, the FSA moves to $S_2$. Finally, after reading 0111010, the FSA moves to $S_3$. The target pattern is thus recognised since $S_3$ is a final state.”

- p. 61, caption of figure 3.4
  - The caption should be extended to explain how the marking of the Petri net changes upon activating a transition. The following should be added: “As can be seen, in order for the transition to be activated, the first input place needs to contain at least 2 tokens and the second input place needs to contain at least one token. This is in fact the case at time $t$, and hence, the transition is activated. Upon activation, the transition consumes the corresponding number of tokens from each of its input places, and produces the specified number of tokens in its output place. The result after activation, time $t+1$, is that the first input place contains 0 tokens, the second input places contains 1 token, and the output place contains 2 tokens.”

- p. 79, definition 4.1
  - The definition is not complete and should be reformulated: “A state $z = \{a_1, ..., a_n\}$ is a set of atomic sentences formulated in some language $\mathcal{L}$. Given an interpretation $I$ of $\mathcal{L}$ in a domain $D$, then $z$ models the state of some discrete process $P$ in $D$ during an interval of time. $I$ necessarily assigns each term to exactly one object in $D$ and it necessarily assigns a truth value to each sentence in $\mathcal{L}$."

- p. 79, definition 4.2
  - The definition needs to be clarified: “Let $z$ be the state of some discrete process $P$. An event $e$ is a change in interpretation $I$ that changes the truth value of at least one sentence $a \in z$."
  - A footnote should be added to the above formulation: “An event $e^{4.1}$ is …” and the footnote text should be: “There may in the world that is being modelled exist events that do not change the truth value of sentences in $\mathcal{L}$. These may be of importance, but they can not be used for recognising situations in the present framework without extending $\mathcal{L}$ to include symbols that are affected by them.”

- p. 80, definition 4.3
  - The definition is incorrect and should be reformulated: “The state of an abstract process of our observable universe $z_U$ is a state $z$, as defined in 4.1, where terms of the language $\mathcal{L}$ refer to ob-
jects in our observable universe, the truth values of the atomic sentences in $z_U$ are inferable from observations in our universe and the interpretation $I$ assigns truth values as determined by the most recent observations of all objects taken from our observable universe at a given point time.”

- **p. 82, section 4.4.1, first paragraph, fourth sentence**
  - It is unclear which earlier definition that is referred to. The sentence should be changed to: “In Definition 4.3, the state of such an abstract process was defined.”

- **p. 82, definition 4.4**
  - The definition should be reformulated as: “A state sequence ... of some discrete process $P$ in domain $D$, where for each pair of consecutive states $z_i, z_{i+1}$, interpretations $I_i \neq I_{i+1}$.”

- **p. 82, definition 4.5**
  - The definition is incorrectly formulated and should be reformulated: “An abstract process of our observable universe $Q_{P_U}$ is a state sequence as defined in 4.4, where each state $z_i$ is a state of an abstract process of our observable universe as defined in 4.3, where interpretation $I_i$ of $z_i$ assigns truth values as determined by the most recent observations of all objects taken from our observable universe at discrete time step $i$.”

- **p. 84, definition 4.6**
  - The definition is not correct and it should be reformulated as: “A situation $s$ in a state sequence $Q_P$ of some process $P$, as defined in 4.4, is a sequence of states as defined in 4.1, where the following constraints are true: (1) each state $z'_i$ in $s$ is a substate of a state $z_k$ which is part of $Q_P$, and (2) for each pair of states $z'_i, z'_j$ in $s$, where $z'_i$ is a substate of $z_k$, $z'_j$ is a substate of $z_l$ and where $z_k, z_l$ are part of $Q_P$, then $i \neq j$ and necessarily $i < j$ if $k < l$.”

- **p. 84, definition 4.7 and surrounding text**
  - The definition is rather a theorem, however, as such, it needs to be proved and derived from previous definitions since it is not clear from the text that this is the case. Such a proof has not been constructed. Hence, definition 4.7 should be removed. This should not have a major impact on the thesis, and on chapter 4, since definition 4.7 is not used elsewhere. In light of the removal of definition 4.7, the two sentences before the definition and the sentence after it should be removed. Lastly, two new sentences should be added: “In light of the present discussion, it should be possible to describe situations in a state sequence in a more compact way using an initial state $z_0$ and a sequence of events, given that events are atomic and inferred in a sequential fashion. A formalisation of this is however left for future work.”

- **p. 87, last paragraph, first sentence**
  - Incorrect statement. The sentence should be changed to: “... predicates, in which a predicate can have a number of arguments that refer to terms.”

- **p. 88, first sentence after the second last formula**
  - Definition 4.1 defines states to consist of atomic sentences, hence, the word predicate should be replaced with “atomic sentence”

- **p. 89, first paragraph**
  - Situations have been defined to consist of states. The third sentence should therefore be reformulated as: “For example, let us depict a potential situation $s$ consisting of $b$ states with a summed total of $r$ atomic sentences.” Furthermore, the fifth sentence should be reformulated as: “Each atomic sentence in the situation could potentially be matched with each of the constraints in the template.”
• p. 98, definition 5.1
  - The definition does not state what it should state and it should thus be changed to the following: “Two tokens \( t_1 = (X_1, C_1) \) and \( t_2 = (X_2, C_2) \) are combinable \( \text{iff} \):
    1. \( \forall x_i \in X_1 \rightarrow \exists x_j \left( x_j \in X_2 \land i = j \land \left(x_i = x_j \lor x_i = U \lor x_j = U\right)\right) \).
    2. \( \forall c_i \in C_1 \rightarrow \exists c_j \left( c_j \in C_2 \land i = j \land \left(c_i = c_j \lor c_i = U \lor c_j = U\right)\right) \).”

• p. 165, section 9.1.2, first paragraph, third sentence
  - The sentence should be replaced with: “Each zone is modelled using a script that is executed every two seconds.”

• p. 176, table 10.2 and third sentence before figure 10.2
  - Table 10.2. The probabilities for creating two pedestrians should be 0.1 in each of the scenario setups.
  - Third sentence before figure 10.2. The sentence should be replaced with: “More specifically, every two seconds there are certain probabilities for creating one or two pedestrians in each of the two spawn zones.”

• p. 197, section 11.1.2, third sentence
  - Pedestrians are created every two seconds, not every five seconds.

Grammatical errors and typos

• p. 14, first sentence after heading 1.5
  - The sentence is missing a word. It should be: “The rest of this thesis is structured in five parts that are outlined as follows.”

• p. 32, second paragraph, second sentence
  - The start of the sentence should be change to: “A situation …”

• p. 37, second paragraph, last sentence
  - Singular/plural mistake and missing words. The sentence should be: “Lastly, the representa-tional component is depicted as being orthogonal to the two former components, and it consis-tists of the languages, interpreters and environments that are used for defining concepts.”

• p. 38, last sentence in paragraph before heading 2.4
  - The sentence is unclear. Besides objects, what kinds of structures can events change the state of? The sentence should be change to: “In a practical view, an event is considered to be a time stamped piece of information representing a change in the state of an object.”

• p. 39, second sentence on the page
  - The sentence is not correct. It should be change to: “In the present context, something refers to situations or types of situations that are a priori defined or experienced.”

• p. 52, second paragraph, fourth sentence from the end
  - The letter d is missing in the word “locate”. It should be: “At the end of the pattern network a number of alpha memories are located.”

• p. 52, second paragraph, last sentence
  - A word should be removed from the sentence which instead should be: “Alpha memories are sometimes also referred to as right memories.”
• p. 55, last paragraph, last sentence
  - The sentence is incorrect. It should be changed to: “For example, temporal relations are essential for recognising a situation in which a smuggler boat is deployed from its mother ship before it meets a contact boat.”

• p. 59, last paragraph before figure 3.3, last sentence
  - The subject of the sentence has been left out. The sentence should be: “The initial state in a finite state automaton is denoted with an arrow from nowhere, and final states are highlighted with double circles.”

• p. 86, section 4.5.2, first paragraph, first sentence
  - Singular/plural. “consist in” should be changed to “consists of”

• p. 87, definition 4.8
  - Singular/plural. “consist of” should be changed to “consists of”

• p. 109, section 6.1, fourth last sentence
  - Singular/plural. The sentence should be changed to “…, where the content consists of predicates of varying arity.”

• p. 179, table 10.6
  - The caption should be changed to: “Event statistics for the maritime scenario.”

• Repeated singular/plural error, “consist of” should be changed to “consists of”
  - p. 11, section 1.4, first paragraph, second last sentence
  - p. 39, section 2.4.1, first paragraph, second sentence
  - p. 48, first paragraph after bullet list, last two sentences
  - p. 48, last paragraph, third sentence
  - p. 50, section 3.1.2, third sentence and footnote 5
  - p. 61, section "Coloured Petri nets", second paragraph, first two sentences
  - p. 69, section 3.3.2, second paragraph, second sentence
  - p. 85, section 4.5.1, second bullet, third sentence
  - p. 96, second bullet, second sentence
  - p. 97, section 5.3, first paragraph, fifth sentence
  - p. 98, paragraph after definition 5.1
  - p. 100, paragraph before figure 5.3, second last sentence
  - p. 104, section 5.5, first paragraph, third sentence
  - p. 110, section 6.2, fourth sentence
  - p. 115, section 6.2.5, second last sentence before algorithm 6.4
  - p. 118, paragraph before figure 6.1, first sentence, parenthesis
  - p. 131, second paragraph, third sentence
  - p. 138, section 7.5.1, second paragraph, sixth sentence
  - p. 177, paragraph before table 10.4, first sentence
  - p. 223, paragraph after research objective 3, first sentence