Universitetet i Stavanger

Career path decisions after receiving a master´s degree in Computational Engineering at UiS

PROJECT REPORT

In the **MOD500** course of the master program **Computational Engineering** at Universitetet i Stavanger

by

René König

Atanu Das

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Studentnumbers	268127, 268128
Course	MOD500
Supervisors	Prof. Reidar B Bratvold
	Assoc. Prof. Aojie Hong

Abstract

A decision model is developed to help a graduating master´s student in Computational Engineering at Universitetet i Stavanger make initial decisions regarding their future career path in order to get the highest possible satisfaction with their career choices in life.

These decisions are firstly to decide if they should work full time, continue studying with a part time job or continue studying full time, secondly which employment type to choose, either working as an employee, a freelancer or an entrepreneur and finally which job to choose from a list of jobs that are compatible with his current study program to a certain degree.

These decisions depend on personal input parameters including job preferences, work-life preference and the importance of employment chance, self-expression, future salary, initial income and work-life balance alignment on their personal satisfaction.

The future salary is uncertain and depending on the career choices they make. Salary distributions for the different jobs are discretized using low, mean and high values from a database to calculate it.

The model suggests optimal career path decisions to maximize satisfaction according to the personal input parameters. Through sensitivity analysis on these parameters other viable career path decisions can be found.

The model is general and customizable for graduating master´s students in Computational Engineering at Universitetet i Stavanger of different personality types and with different preferences.

To extend the model to other programs and universities some adaptations and an extension of the jobs list are necessary.

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List of abbreviations

UiS ..... Universitetet i Stavanger
INFP-T ..... Mediator Personality Type
INTP-T ..... Logician Personality Type

1 Introduction

The decision model depicted in Figure 1 and Figure 2 is developed to help a graduating master´s student in Computational Engineering at Universitetet i Stavanger (UiS) make initial decisions regarding their future career path.

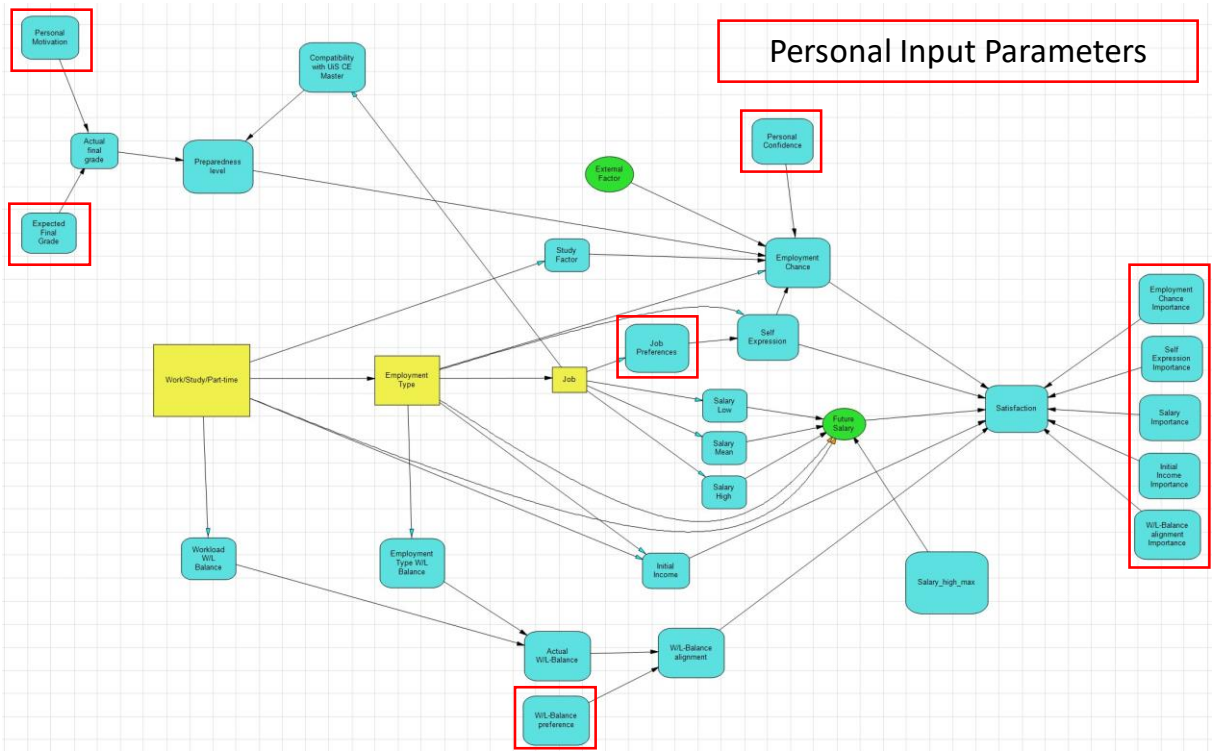

Figure 1: Model Structure – Influence Diagram.

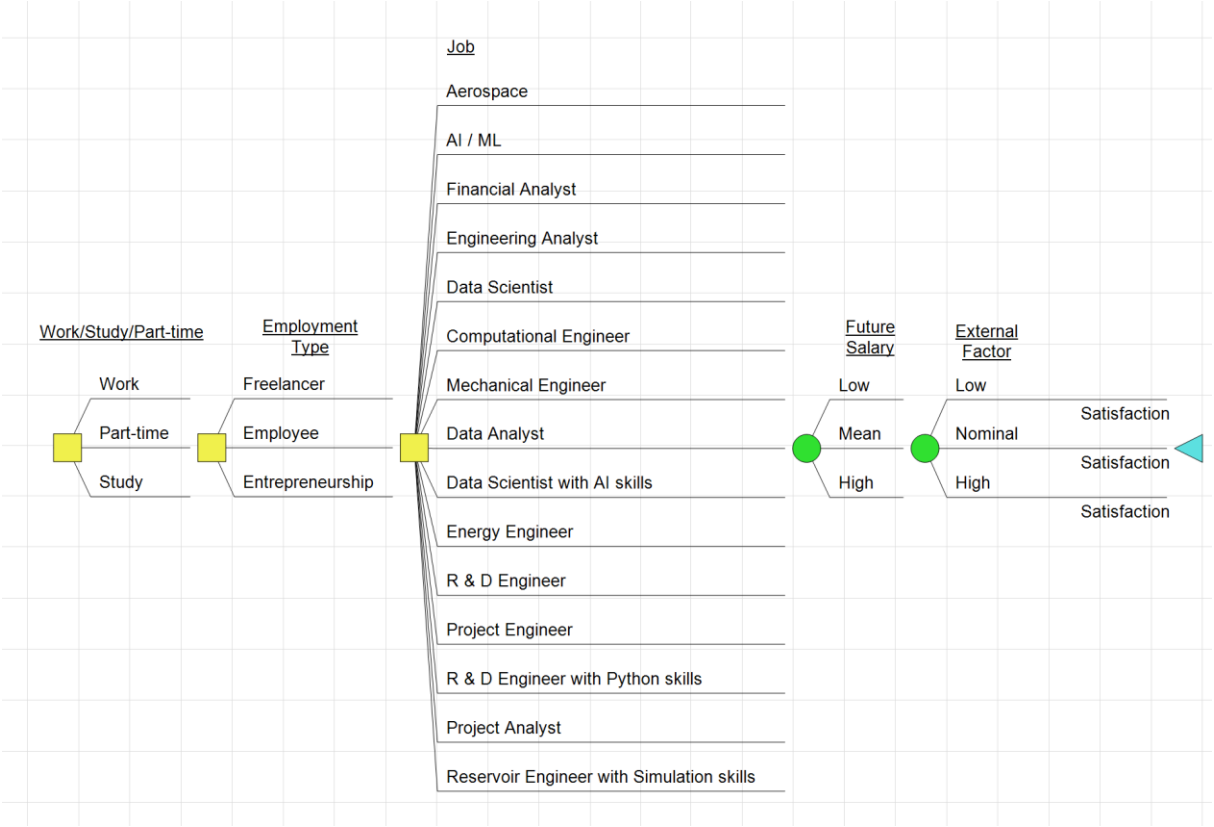

Figure 2: Model Structure - Decision Tree.

1.1 Problem description

A Computational Engineering master's student at UiS is facing the decisions that will determine their future career path after receiving their master´s degree. Note that this model only focuses on the initial career path decisions and that the future career path may diverge from this initial plan to comply with changing circumstances.

2 Framing & Formulation

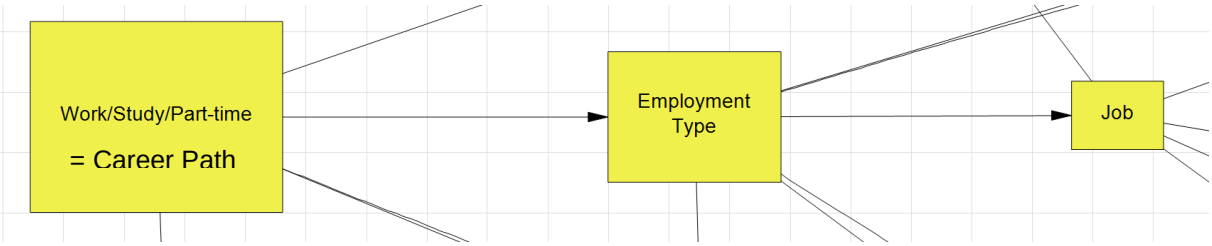

Figure 3: Initial Career Path Decisions.

Figure 3 depicts the career decisions. The alternatives are:

1) What to do? → Career Path
   a) Work
   b) Part-time
   c) Study
2) How to work? → Employment type
   a) Freelance
   b) Entrepreneur
   c) Employed
3) In what profession to work? → Job
   a) Aerospace
   b) AI / ML
   c) Financial Analyst
   d) Engineering Analyst
   e) Data Scientist
   f) Computational Engineer
   g) Mechanical Engineer
   h) Data Analyst
   i) Data Scientist with AI skills
   j) Energy Engineer
   k) R & D Engineer
   l) Project Engineer
   m) R & D Engineer with Python skills
   n) Project Analyst
   o) Reservoir Engineer with simulation skills

2.1 Career Path

The student must decide what to do after receiving their master's degree in computational engineering at UiS to get a clear view on his future career path.
The decision alternatives have been simplified to three viable career paths:

2.1a) Work:

The student decides to work in their chosen job right after receiving their master's degree in computational engineering at UiS.

2.1b) Part-time:

The student decides to study for another master or a PhD in a field that matches their chosen job and work in that job part-time alongside their studies.

2.1c) Study:

The student decides to study for another master or a PhD in a field that matches their chosen job full time and work in that job after finishing their studies.

There is no differentiation between studying for another master's degree or a PhD to reduce the model's complexity.
It is assumed, that the student has a rough idea of what he wants in life and thus the study field will match the chosen future job or part-time job. Therefore, studying without a clear goal or to find one´s purpose in life is not considered. Similarly, doing nothing, being unemployed, traveling the world or other methods in order to find one´s purpose in life are not considered.

2.2 Employment type

The student must decide how they will work right after receiving their master´s in computational engineering at UiS, during or after their further stuies, in order to satisfy their preferences over employment chance, self-expression, future salary, initial income and work-life balance alignment.

The decision alternatives have been simplified to three viable employment situations:

2.2a) Freelance:

The student decides to work as a freelancer.

2.2b) Entrepreneur:

The student decides to work as an entrepreneur.

2.2c) Employed:

The student decides to get employed by a company or (governmental) organization.

Mixed employment types are not included to reduce the model's complexity. Note that some jobs might be more suitable for a certain employment type than others. This factor is not considered to reduce the model's complexity.

2.3 Job

The student decides to work in one of the listed jobs.

This list is certainly not a complete list of possible jobs to work in after receiving a master´s degree in computational engineering. To extend this list with a certain job, the low, mean and high salaries for this job have to be known and it´s compatibility with the UiS computational engineering master´s program has to be judged in comparison with the other jobs on the list.

3 Deterministic structure

Almost all values, apart from salary values, are scaled between 0 and 1.

The final value is the student´s satisfaction with their career choices and the life they lead to in the future, displayed in 0-100%. It is depending on the decisions they take, personal and intrinsic values and the uncertainties that surround those values.

The definition of satisfaction is highly dependent on personal preferences and can be different for different personality types. One student might prefer a higher salary over a worse work-life balance and another might not.

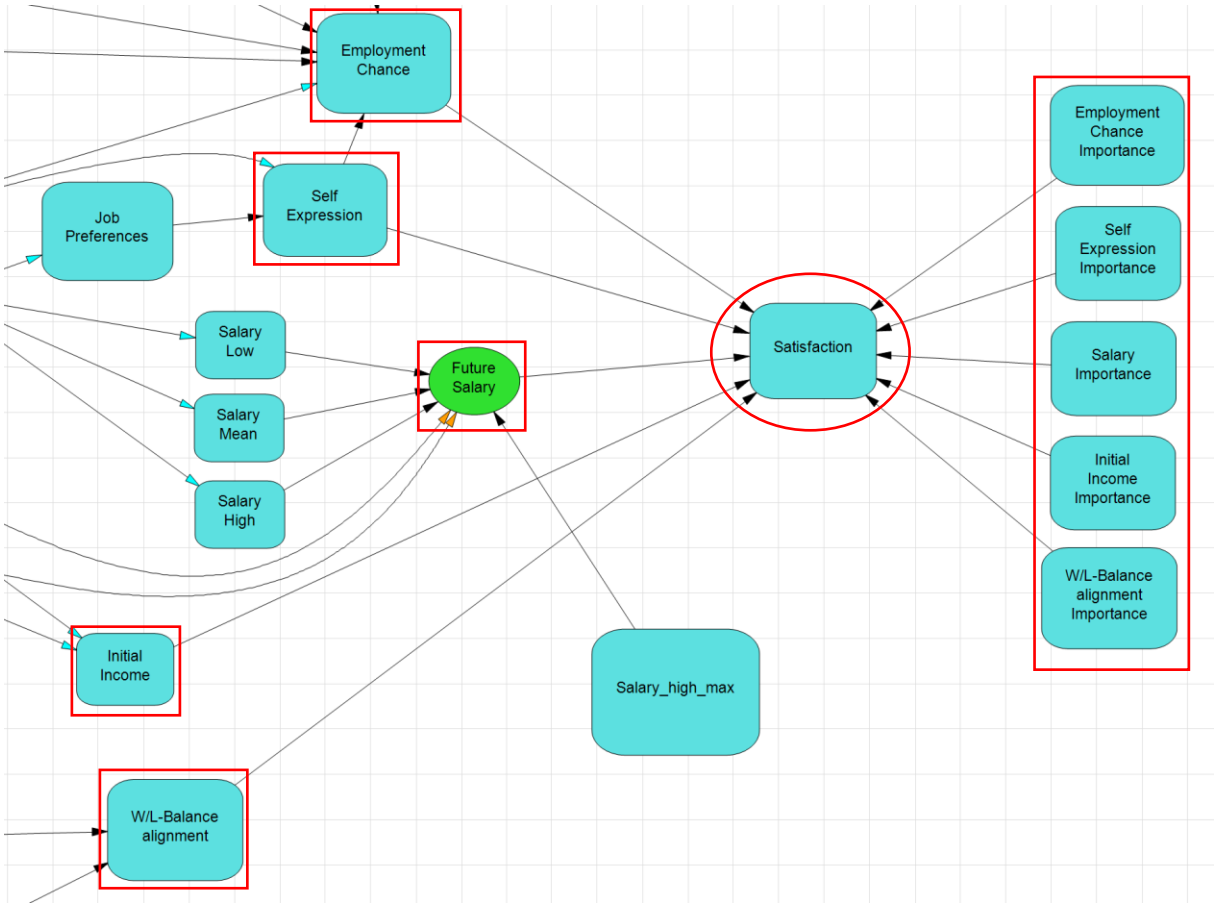

Figure 4: Composition of the final "Satisfaction" value.

As depicted in Figure 4, the satisfaction is comprised of:

1) Employment chance
2) Self-Expression
3) Salary Importance
4) Initial Income
5) Work Life Balance alignment

To capture the different preferences different people may have over these factors the decision maker (student) must define their personal importance factor [0…1] to each one of them in the importance value nodes on the right of the “Satisfaction” value node in Figure 4.

3.1 Employment Chance

Employment chance represents the chance of being employed right after receiving one´s master's degree in computational engineering at UiS for the "Work" and "Part-time" career path or after finishing further full time studies in a field that matches the desired job for the "Study" career path.

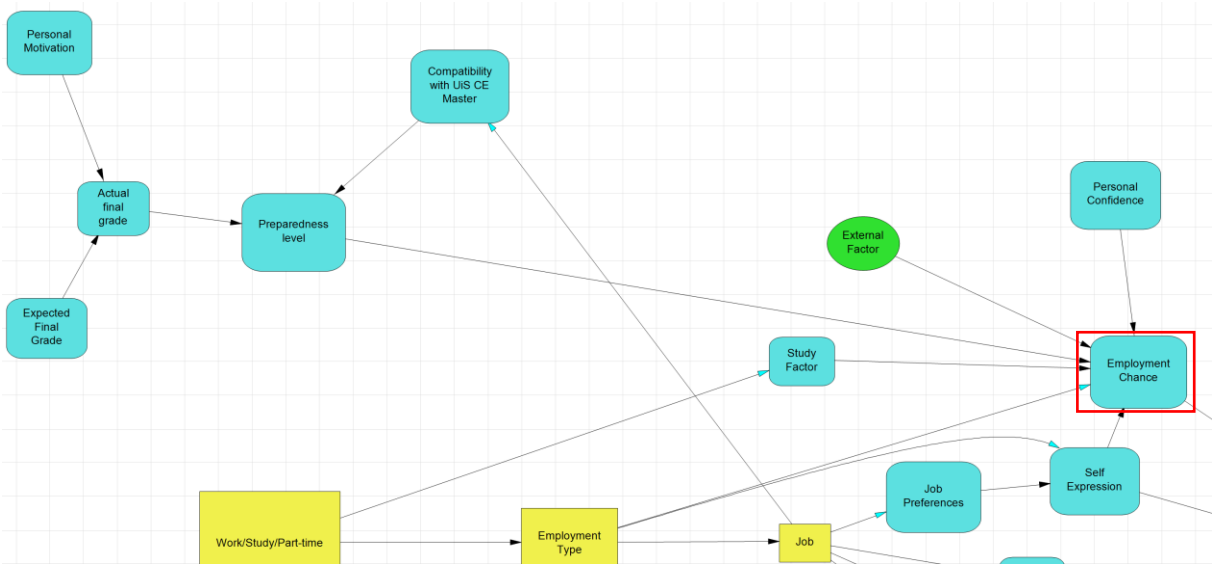

Figure 5: Employment Chance Factors.

Figure 5 shows the multiple factors influencing the employment chance.

3.1.1 Self Expression

Someone who can identify with the job they are applying for has a higher chance of getting it than someone who doesn´t identify with the job. How much a student can identify with the different jobs listed in the job decision are personal values that have to be set in the job preferences value node by the decision maker (student).

3.1.2 Employment Type

Since as an entrepreneur and freelancer you are your own employer and can more or less freely decide whom you work for, the employment chance is higher for those employment types, compared to having to apply for employment at a company or (governmental) organisation.

3.1.3 Study Factor

Completing additional studies for your desired job will improve your employment chance.

3.1.4 Preparedness level

The preparedness level determines how well someone is prepared for the desired job. Someone who is well prepared will have a higher employment chance than someone who is not as well prepared. The preparedness level depends on the compatibility of the desired job with the UiS computational engineering master´s program and the final grade the student scores in the program. The actual final grade mainly depends on the final grade the student expects to score and their personal motivation to achieve that grade. These two values are therefore personal values that have to be set by the decision maker (student). Note that other external factors like the learning environment are accounted for in the external factors uncertainty influencing the employment chance further down the line.

3.1.5 External factors

The external factors uncertainty combines all the external uncertainties that influence the employment chance. This includes variations in the final grade because of the learning environment, stress factors, non-objective grading, variations in the preparedness level because of different course selections and varying performance over different courses, the number of vacant jobs, the amount of competition for a job and more. Note that accounting for all those uncertainties, which may be depending on input values and the decisions taken, introduced a lot of model complexity, which is why they have been merged into one external factors uncertainty.

3.1.6 Personal Confidence

Someone who is more confident will generally have a higher employment chance. This is a personal value that has to be judged and entered by the decision maker (student). Note that a potential overconfidence is only accounted for in the external factors uncertainty.

3.2 Self Expression

As depicted in Figure 6, the potential to express oneself in their future profession, or how much someone is able to identify with their job, is depending on personal job preferences and the employment type. This not only influences the employment chance, as described in “3.1.1 Self Expression”, but also directly influences the overall satisfaction, depending on the assigned personal importance, as discussed in “3 Deterministic structure”.

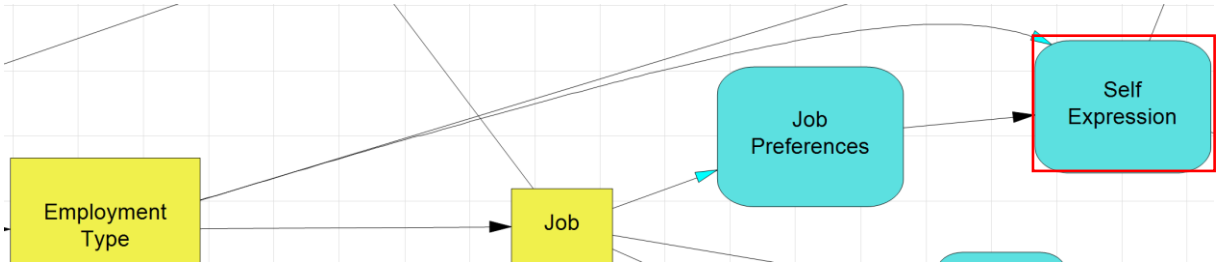

Figure 6: Self Expression Factors.

3.2.1 Job Preferences

If someone has to work in a job they can´t identify with a lot, their work won´t be as fulfilling and therefore potentially less satisfying, compared to someone who is able to completely express themselves in their job.

Different people have different preferences for their future job. Therefore these preferences have to be set by the decision maker (student) in the Job Preferences value node, as displayed in Figure 7. Note that the values entered should be between 0 and 1, with the most preferred job having the highest value.

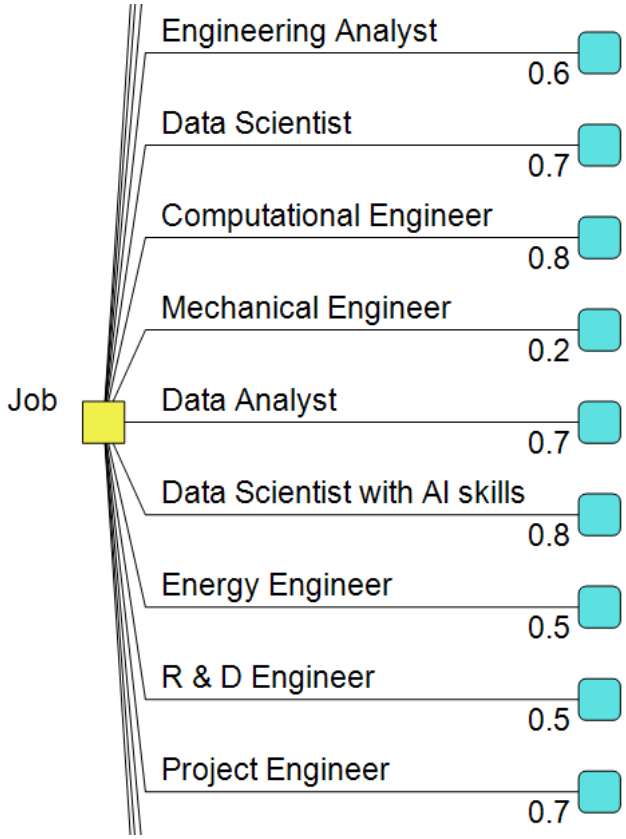

Figure 7: Excerpt of potential job preferences.

3.2.2 Employment Type

Working as a freelancer and especially as an entrepreneur naturally gives a higher potential to express oneself in their job, compared to the rigid structures of being employed at a company.

3.3 Future Salary

As depicted in Figure 8, the potential future salary for a given set of career choices, which is uncertain, is dependent on the career path and employment type decision as well as the low, mean and high salary of any given job. It is then scaled to a 0 to 1 scale using the Salary_high_max value node, where the highest high salary has to be entered manually.

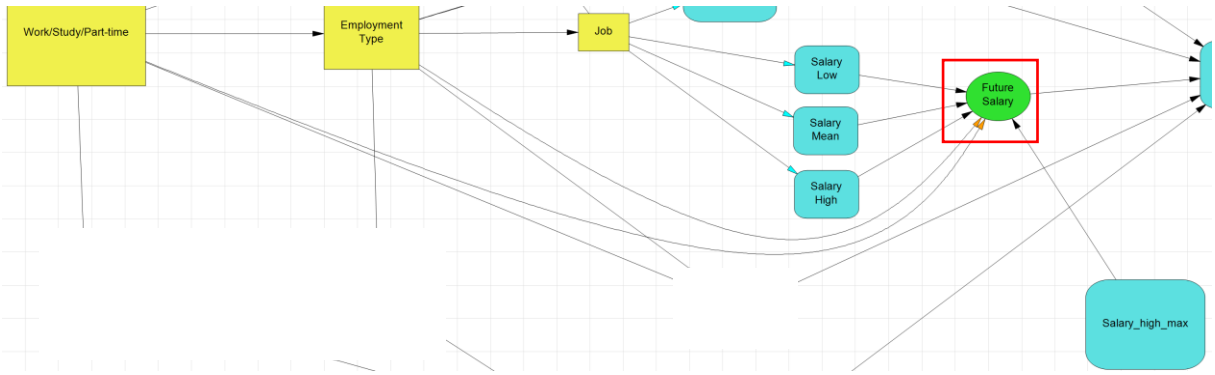

Figure 8: Future Salary Factors.

3.3.1 Career Path and Employment Type

Different combinations of career paths and employment types hold different potentials of receiving a lower than average, average, or higher than average salary in the future.

3.3.2 Salary low, mean & high

Statistically different jobs will yield different salaries and have different salary distributions. These distributions are discretized using the salary low, mean and high from salaries from the United States using the payscale salary database. [1]

Note that even though the regional salaries in Norway (or other countries) may differ, the United States data was chosen for its higher popularity and therefore richer data provided by more users, compared to the limited amount of users in e.g. the Norwegian dataset.

As depicted in Figure 9 the actual values for salary low, mean and high for the different jobs are stored in their respective value nodes.

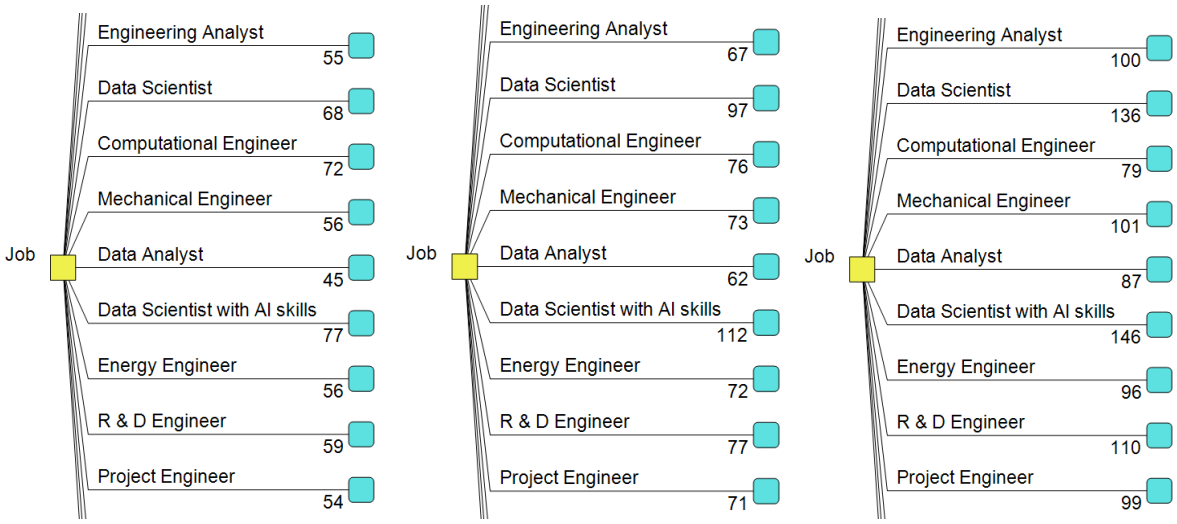

Figure 9: Excerpt of salary low, mean and high values.

The highest high salary of all jobs present in the job alternatives has to be manually entered into the Salary_high_max value node to scale all salaries accordingly.

3.4 Initial Income

As depicted in Figure 10, the initial income after receiving one´s master´s degree in computational engineering at UiS depends on the career path and employment type decision.

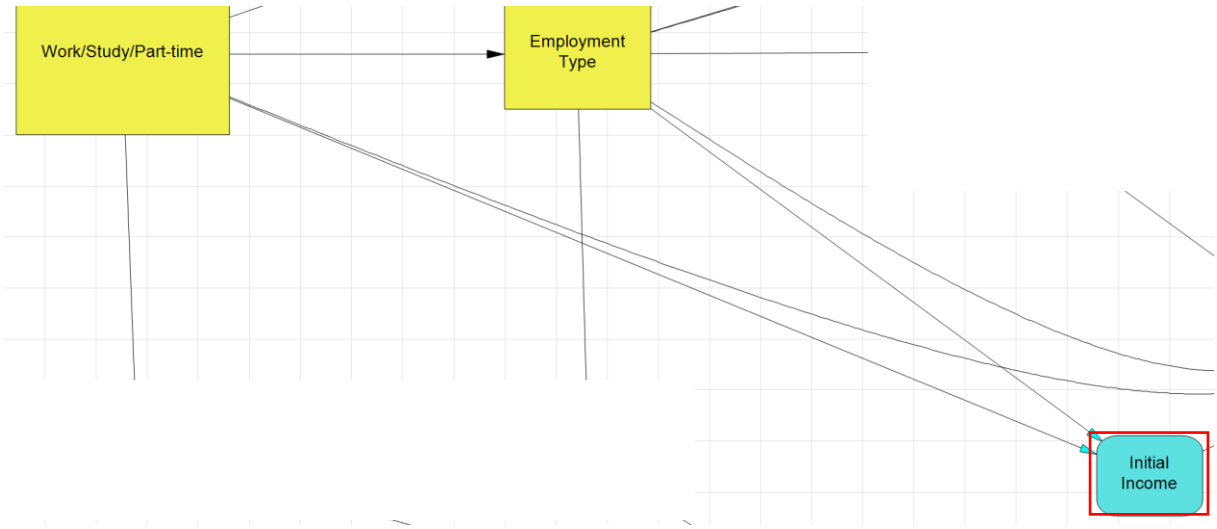

Figure 10: Initial Income Factors.

3.4.1 Career Path

If the student decides to continue studying full time after receiving their master´s degree in computational engineering at UiS, they won´t have any initial income. If they decide to work and study part-time they will have some initial income and if they decide to directly work full time, their initial income will be the highest.

3.4.2 Employment Type

Working as a freelancer and especially becoming an entrepreneur often comes with low revenue and high investment costs in the beginning to build a brand and it´s reputation before a lot of money can be gained from selling a lot of services to high paying customers. Therefore naturally the initial income will be low, compared to a normally employed worker.

3.5 Work-Life Balance Alignment

As depicted in Figure 11, the Work-Life balance alignment depends on the personal Work-Life balance preference and the actual Work-Life balance in the future career situation. It evaluates how good the actual work-life balance is aligned with one´s personal preference.

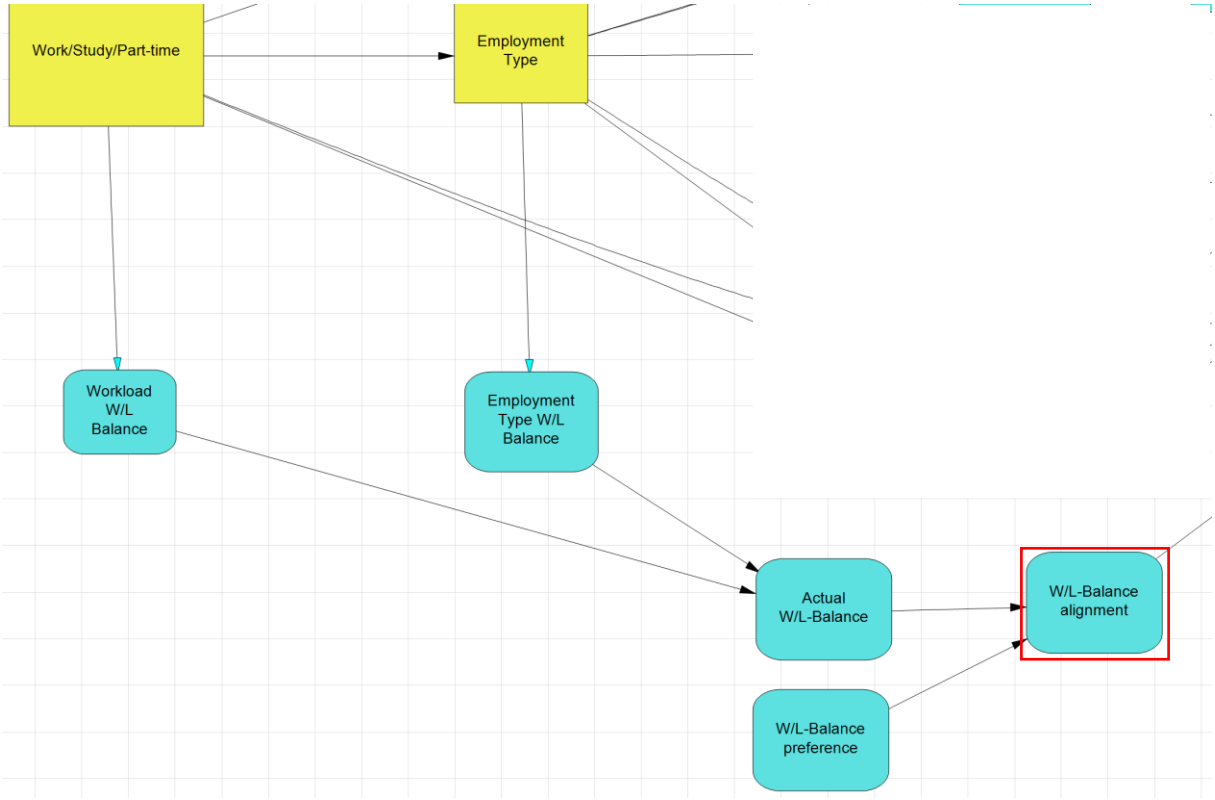

Figure 11: Work-Life Balance Alignment Factors.

3.5.1 Work-Life Balance Preference

Different people have different preferences in terms of their work-life balance. This preference has to be entered into the Work-Life balance preference value node as a value between 0 and 1, with 0 meaning the decision maker (student) prefers to only focus on work without any focus on life, leisure, hobbies and social interactions, 1 meaning only focus on life without any focus on work and 0.5 meaning a perfect balance between work and life.

3.5.2 Actual Work-Life Balance

The actual Work-Life balance in one´s future career situation depends on the chosen career path and employment type. Entrepreneurship requires a lot more focus on work than on life, compared to normal employment or freelance work. Freelance work usually allows for a more flexible schedule and therefore higher focus on life compared to normal employment.

4 Probabilistic Evaluation

After initially trying to include uncertainties for most of the factors, as depicted in Figure 12, Figure 13 and Figure 14, it was decided to disregard them or combine them into the external factors uncertainty influencing the Employment chance value as discussed in “3.1.5 External factors“ in order to reduce the model´s complexity

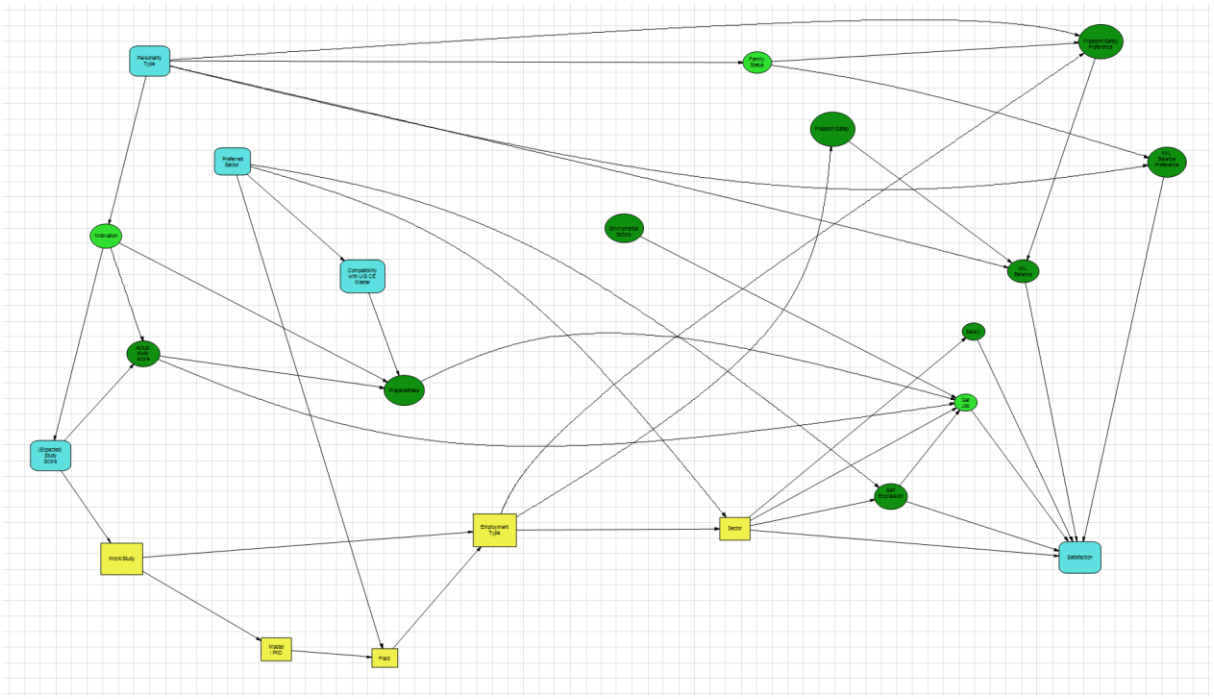

Figure 12: Model V1 Influence diagram.

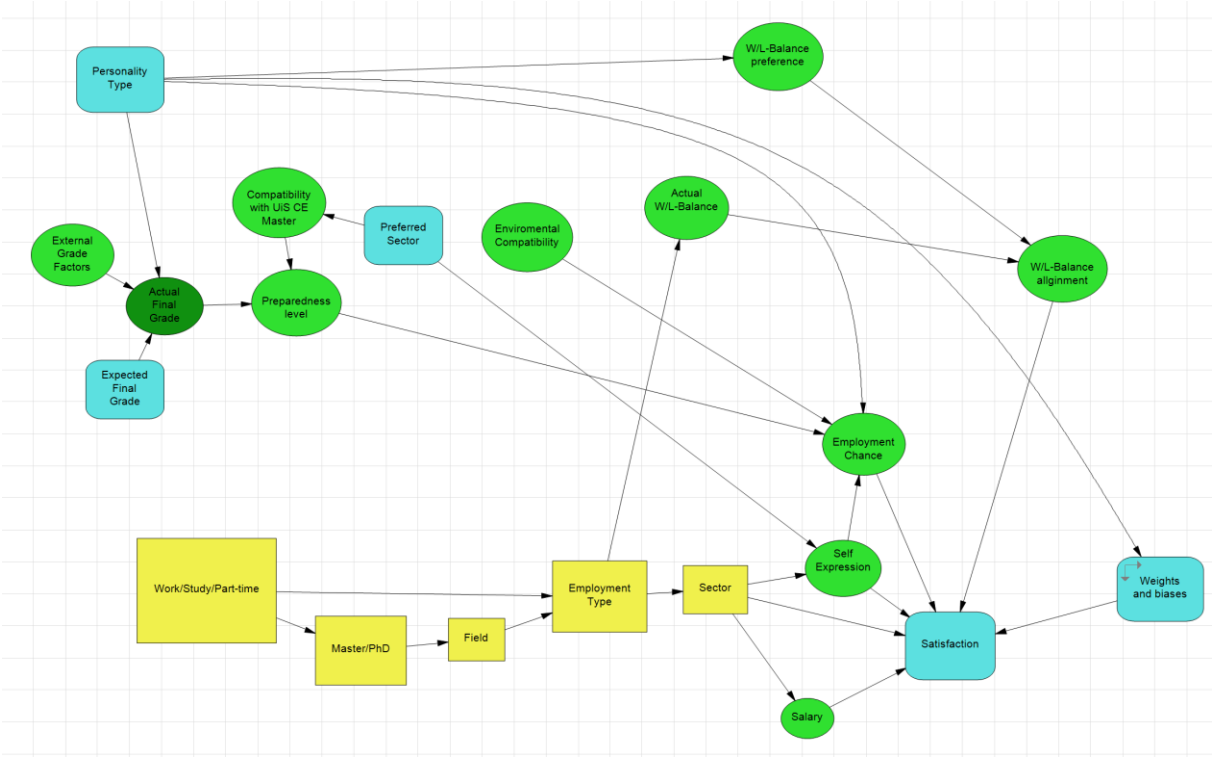

Figure 13: Model V2 Influence diagram.

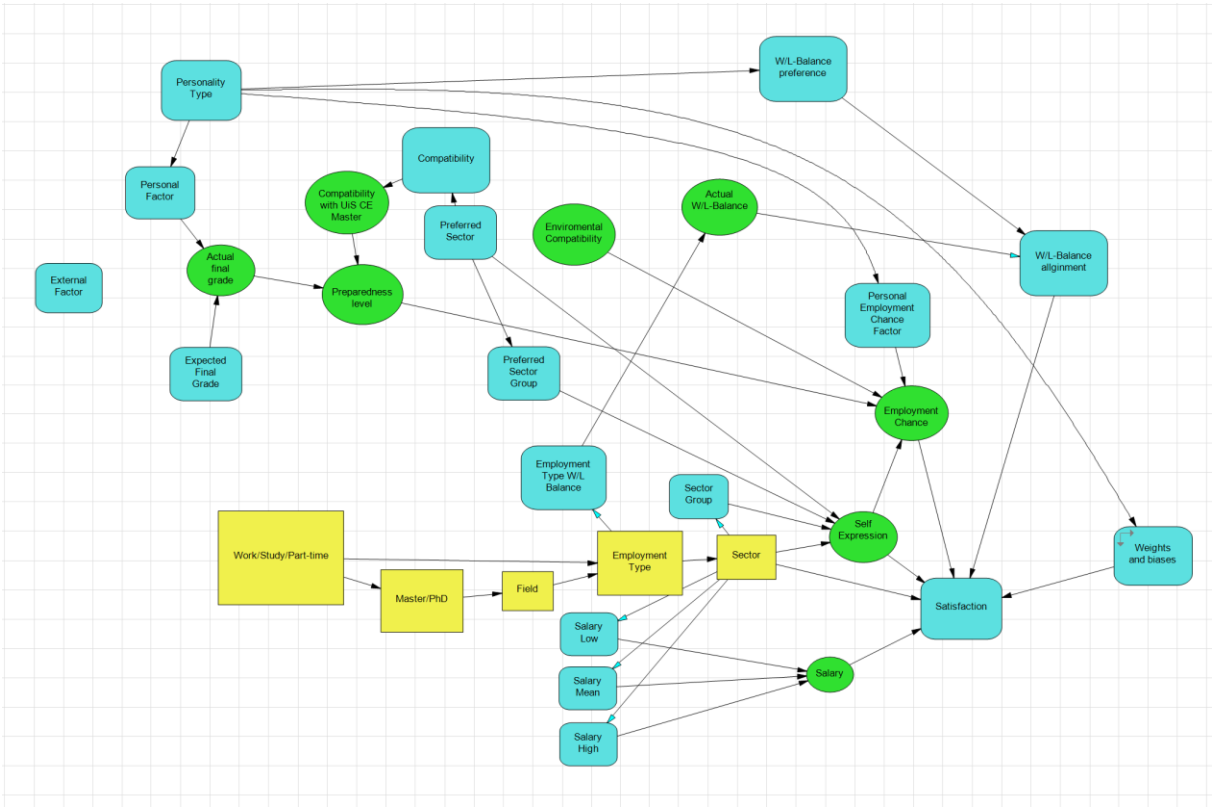

Figure 14: Model V3 Influence diagram.

Therefore, the major uncertainty in the final model is the future salary. As described in “

3.3 Future Salary" the future salary is dependent on the career path and employment type. Thus, for each career path – employment type combination the probability of getting a low, mean or high future salary in the chosen job have been assessed as depicted in Figure 15.

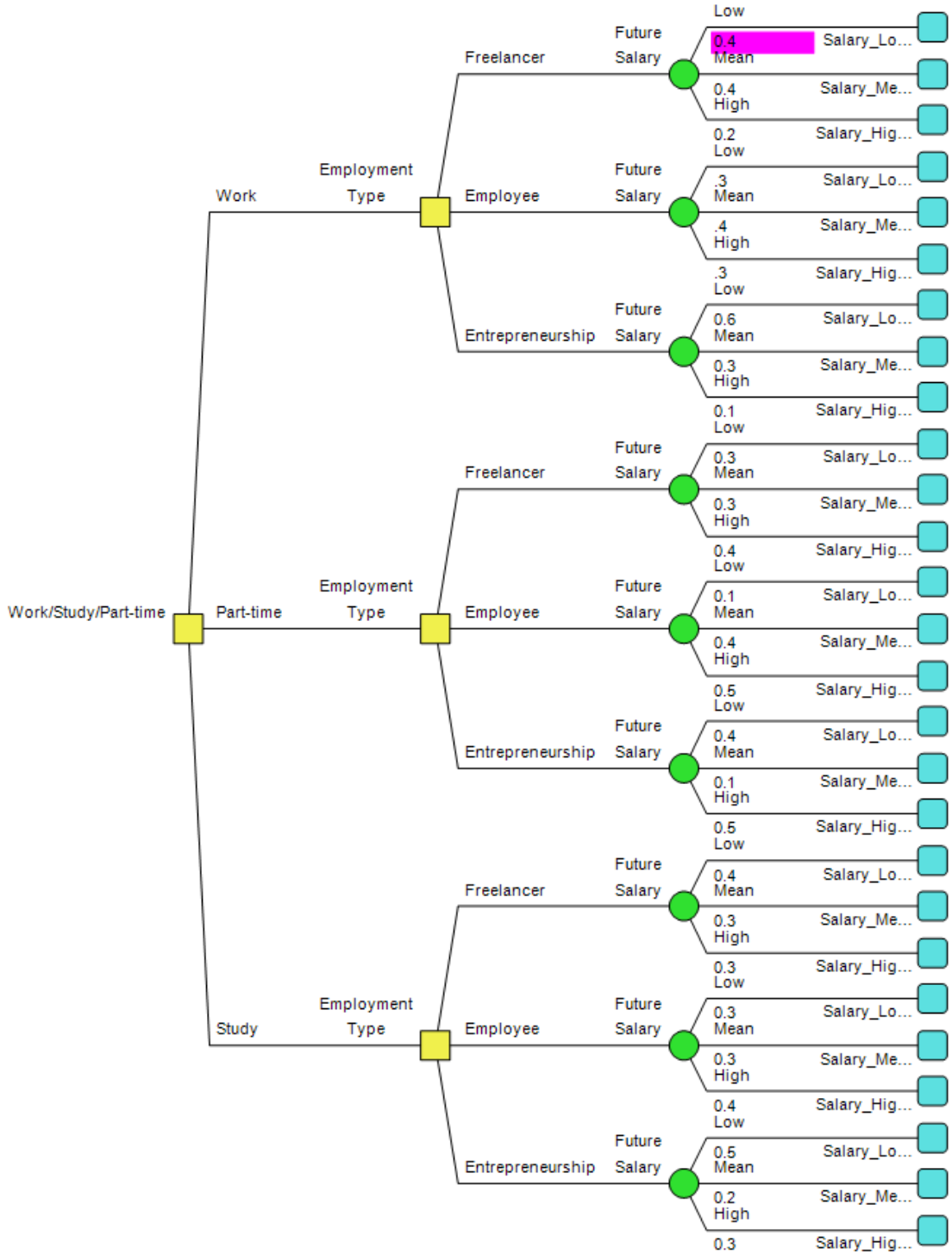

Figure 15: Probabilistic Evaluation of Future Salary.

5 What-If, Scenario & Options Analysis

To judge the model´s performance it has been tested on different cases, including real people studying computational engineering at UiS in their first and second year, as well as fictional cases.

In each case the value nodes for the importance of employment chance, self-expression, future salary, initial income and work-life balance alignment, the work-life balance preference, the job preferences, the personal confidence and motivation and the expected final grade have been adjusted (between 0 and 1) accordingly.

The policy trees are examined and compared, and One-Way and Two-Way rainbow diagrams are used to examine the sensitivity of the expected satisfaction and decision policy to different input values.

5.1 Neutral Base Case

For the neutral base case the importance values and work-life preference as well as the job preferences are all set to 0.5. Personal confidence and motivation are set to 1 and expected final grade to 0.8.

As depicted in Figure 16, the model suggests to work as an employed Reservoir Engineer with simulation skills. Because there are no preferences for a certain job, we can deduct that this job provides the best combination of future salary and employment chance, because of a high preparedness level through a high compatibility with UiS' computational engineering master program.

Working as an employee gives the best combination of employment chance, self-expression, future salary, initial income and work-life balance alignment for a neutral student.

Both observations are reasonable and as expected.

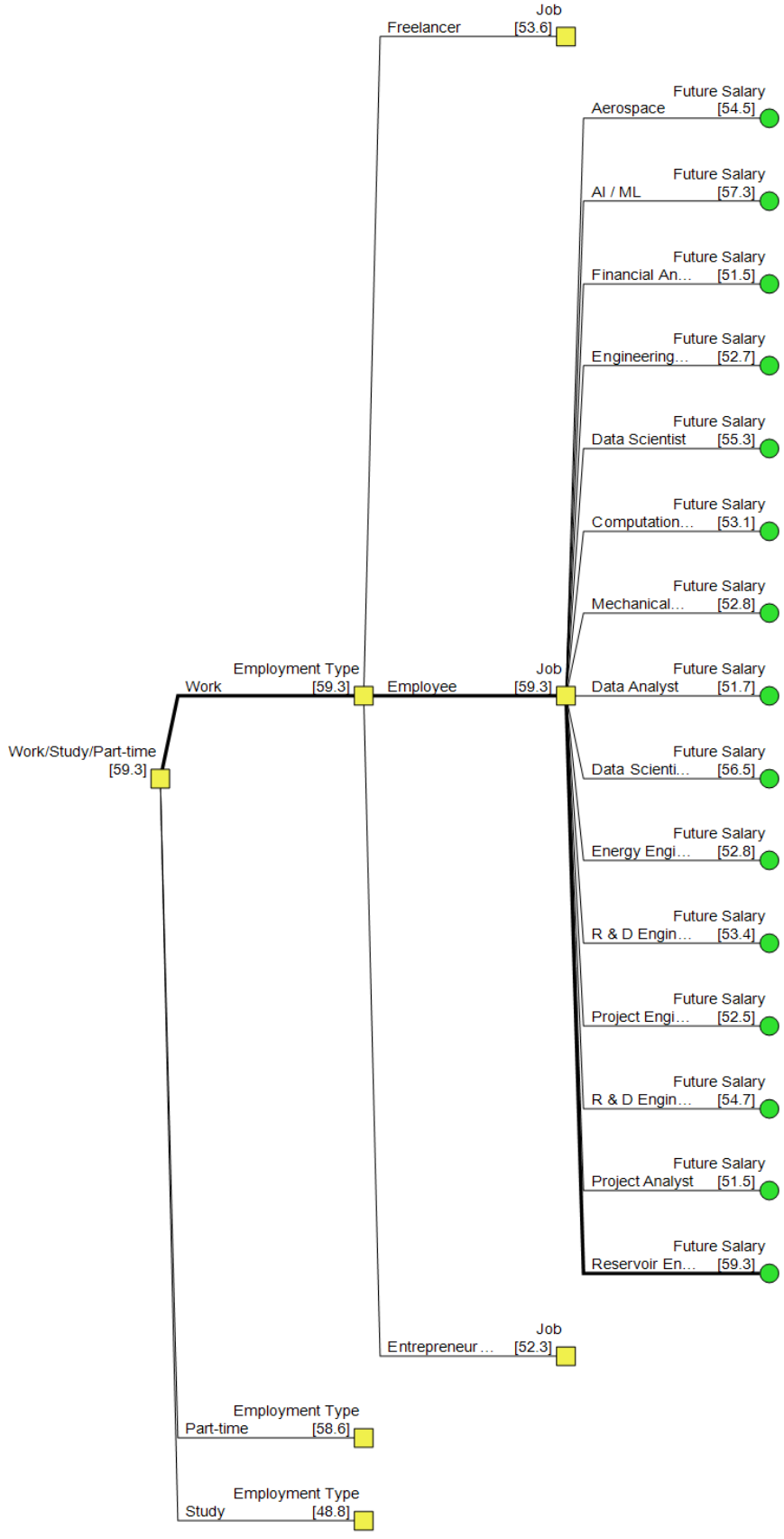

Figure 16: Policy Tree Neutral Base Case.

Figure 17 shows that with a higher preference for salary over the other satisfaction factors the model suggests to work and study part-time.

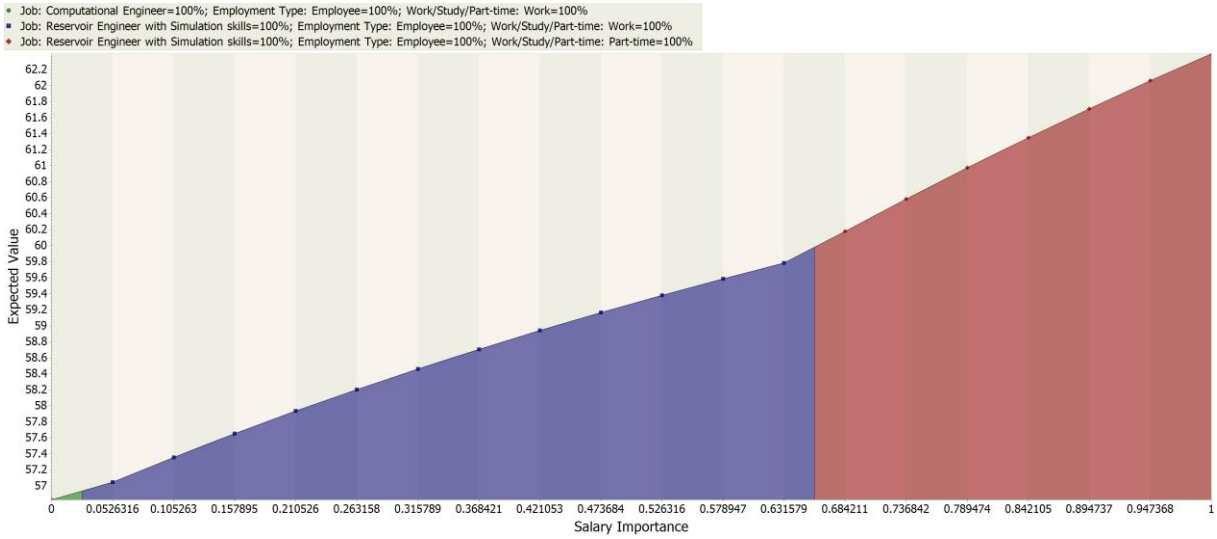

Figure 17: Salary Importance Sensitivity Neutral Base Case

This makes sense, because while the initial income is lower for a part-time job, the increased knowledge from the studies combined with the practical experience from the part-time job increase the chance for a timely promotion and raise when working fulltime afterwards.

Also note that if the salary does not matter at all (0 importance) the model suggests Computational Engineering, which again makes sense, because it has the best alignment with the UiS Computational Engineering master´s program and therefore best employment chances.

Figure 18 shows that with a higher job preference for Reservoir Engineer with simulation skills or Aerospace the respective job will be suggested.

If the preference of both is sufficiently low this reduces the competition in terms of viable jobs and therefore enables AI / ML to compete with Reservoir Engineer with simulation skills in terms of a combination of high salary and high employment chance through compatibility with the UiS Computational Engineering master´s program.

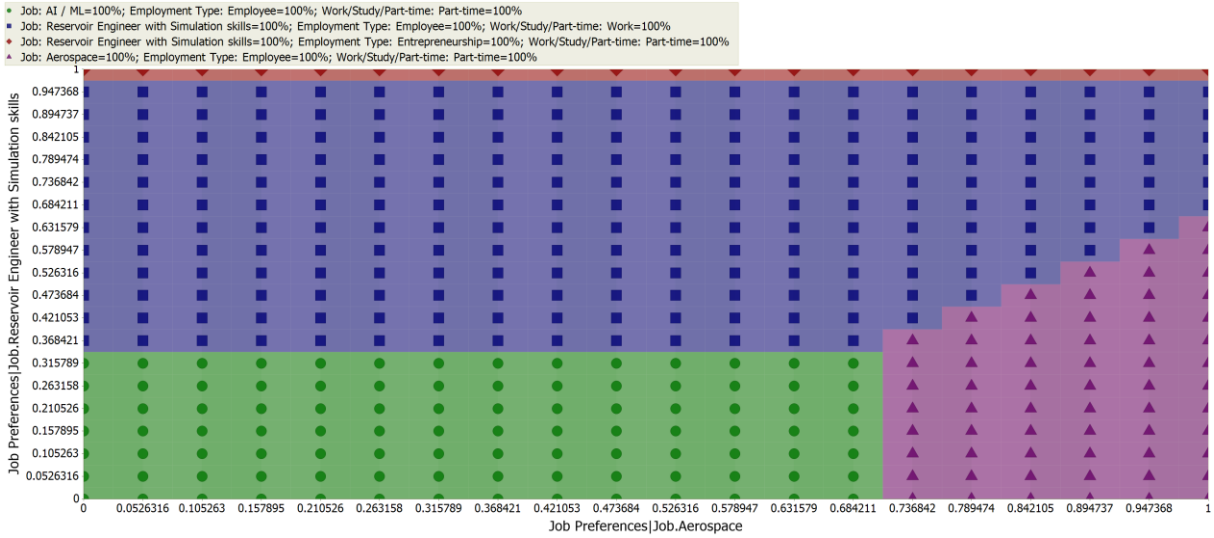

Figure 18: Job Preference Sensitivity Neutral Base Case.

Note that it requires a higher preference for Aerospace (>0.7) for it to be considered the best option compared to a lower required preference for Reservoir Engineer with simulation skills (>0.35) and with a sufficiently high preference for Reservoir Engineer with simulation skills (>0.65) the preference for Aerospace does not matter, as Reservoir Engineer with simulation skills has the better combination of salary and compatibility with the UiS Computational Engineering master´s program.

Also note that with a sufficiently high preference for Reservoir Engineer with simulation skills the model suggests part-time entrepreneurship to increase salary.

5.2 Money Focus

For a case, where the decision maker (student) only focuses on maximising the obtainable money, the salary importance value is set to 1 and all the other importance values are set to 0. The expected final grade, personal motivation & confidence are set to one and the work-life balance preference and job preferences are set to 0.5

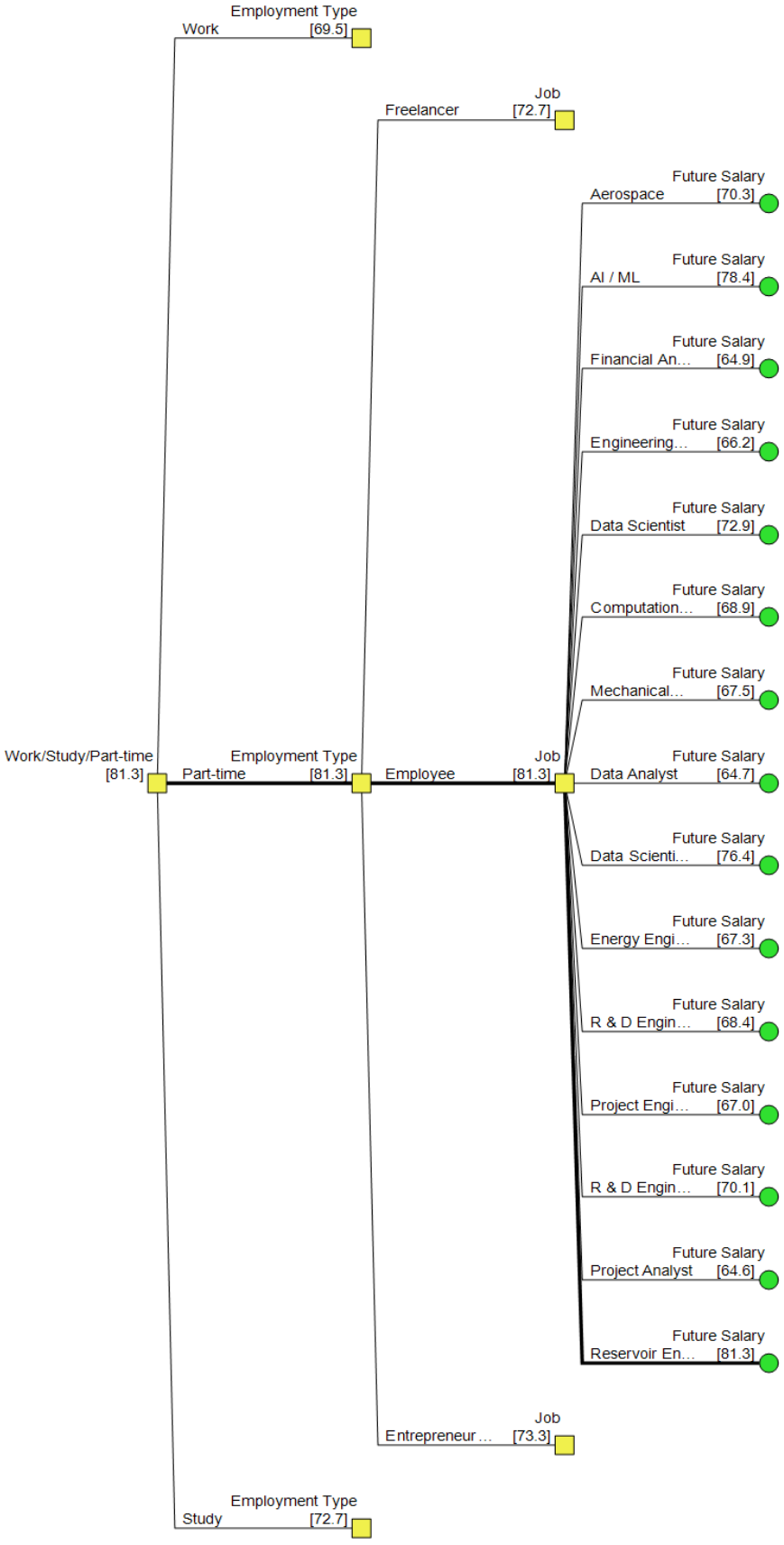

Figure 19: Policy Tree Money Focus.

Figure 19 shows that the best career path to make the most money possible is to part-time work and study as a Reservoir engineer with simulation skills.
Note that the satisfaction such a decision maker can get from this career path is quite high with 81.3%, compared to the maximum 59.3% from the base case.
This makes sense, because the decision maker has a clearer idea of what he wants (the money) compared to the neutral base case. This also means, that the money focused decision maker will get less satisfaction from other career paths than the suggested one, while the neutral base case decision maker can get similar satisfaction as from the suggested career path from slightly different career paths.
Also note that unintuitively entrepreneurship and freelance work don´t give a higher average salary, because while they have more potential to gain a higher than average salary, they also have more risk of getting a lower than average salary.
Note that, as Figure 20 shows, with a high enough self-expression importance (>0.3) the model will suggest entrepreneurship instead of employment.

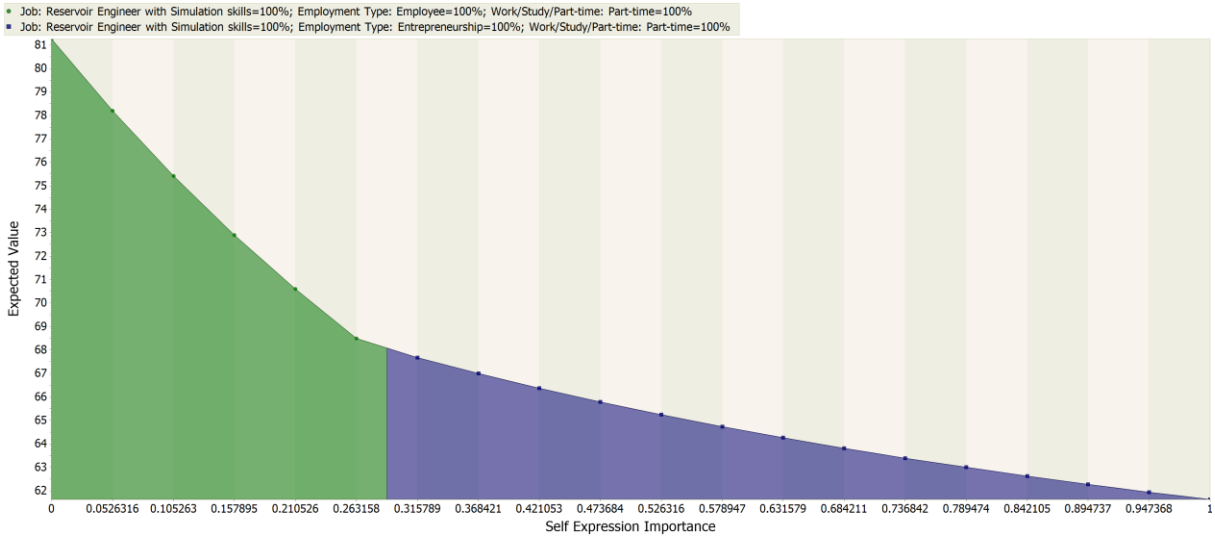

Figure 20: Self Expression Importance Sensitivity Money Focus.

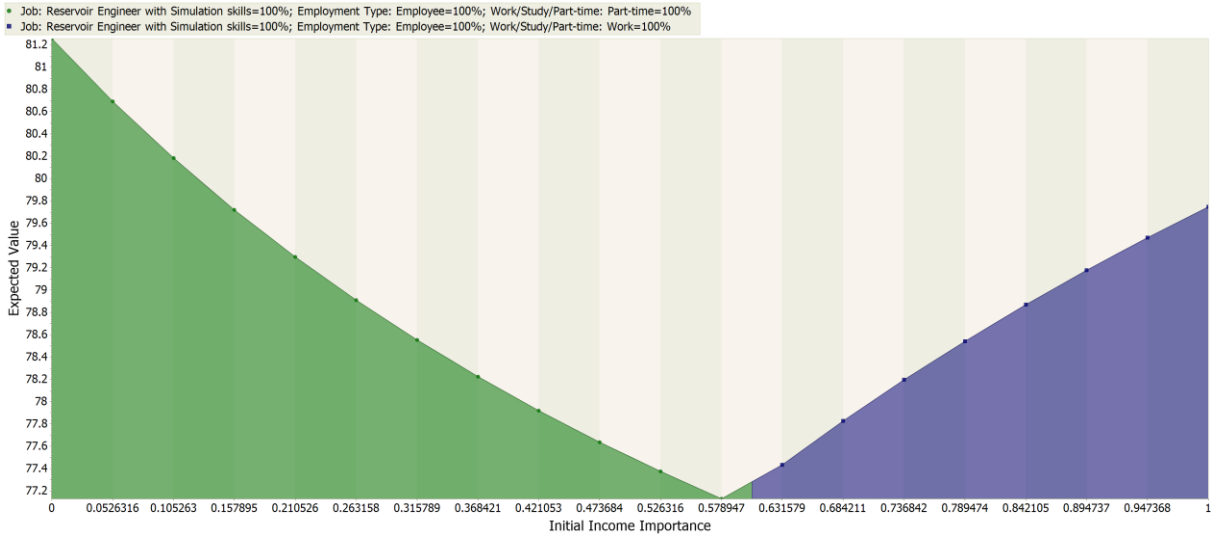

Figure 21: Initial Income Importance Sensitivity Money Focus.

Figure 21 shows that with sufficiently high importance on initial income (>0.6) the model suggests directly working instead of study and work part-time.

This is as expected, because the initial income of a part-time job will be lower than a full time job.

Note that with an increase in initial income importance the expected satisfaction value initially decreases up to that point and increases again when choosing to work. This makes sense, because the higher need for initial income can´t be covered as well by a part-time job as it can be by a full time job, which is an less satisfying compromise. When the initial income importance is sufficiently high and the work alternative is chosen the satisfaction increases again, because the higher need for initial income can be covered better.

5.4 Expression Focus

For a case, where the decision maker primarily focuses on the potential to express themselves and focus on their life, the importance values for self-expression and work-life balance alignment as well as the work life balance preference, personal motivation and confidence are set to 1. The other importance values are set to 0. The expected final grade is set to 0.8 and the job preferences are all set to 0.5. Note that a real person would set the value of the job they prefer the most to 1 and the rest to 0 here.

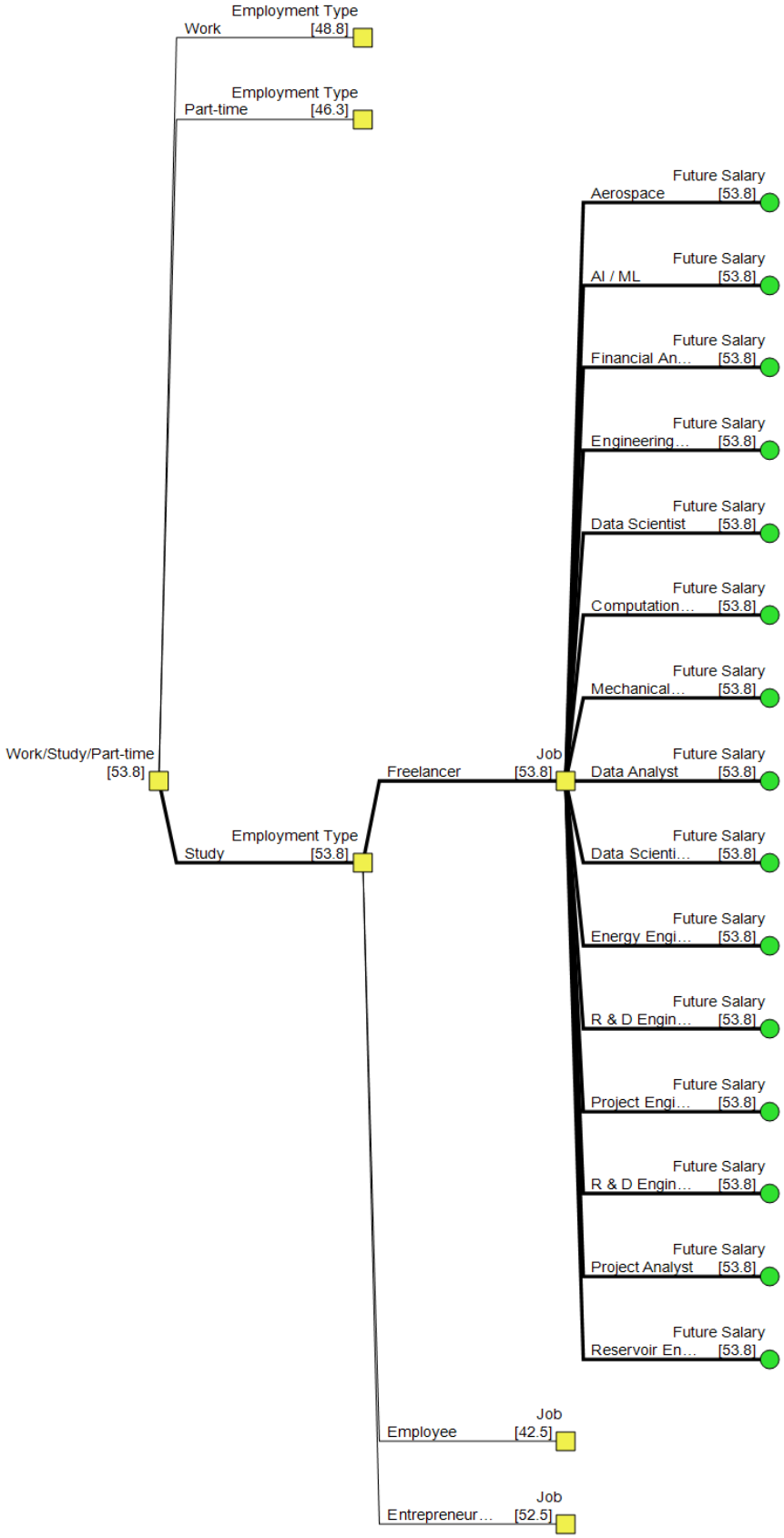

Figure 22: Policy Tree Expression Focus.

Figure 22 shows that in order to maximize self-expression and the ability to focus on life the model suggests to study full time and then work as a freelancer. Note that all the jobs are equally suggested since the salary and employment chance do not matter to this decision maker, so it only comes down to his personal job preference which job to choose.

This can be seen in Figure 23, which shows that as soon as the job preference for one job is higher than the others (>0.5 in this case), the respective job will be suggested to maximize self-expression.

Note that while the legend shows that the model is suggesting aerospace below this threshold, the model actually suggests all the other jobs equally, as can be seen in Figure 22.

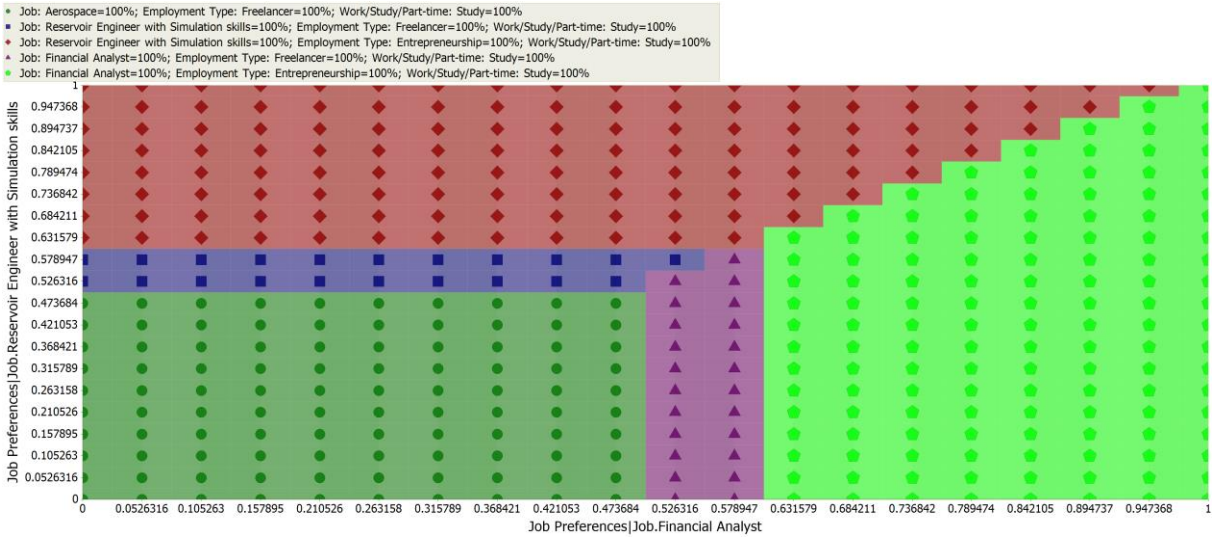

Figure 23: Job Preference Sensitivity Expression Focus.

Also note that above a certain threshold (>0.6) the model suggests entrepreneurship instead of freelance work to maximize self-expression by sacrificing some work-life balance alignment, which increases the overall satisfaction, because the loss in work-life balance alignment is smaller than the gain in self-expression.

Figure 24 shows that with a lower work-life preference (<0.7) the model will suggest study and become an entrepreneur, or work (<0.5) or part-time (<0.45) entrepreneurship instead of study and become a freelancer (>0.7)

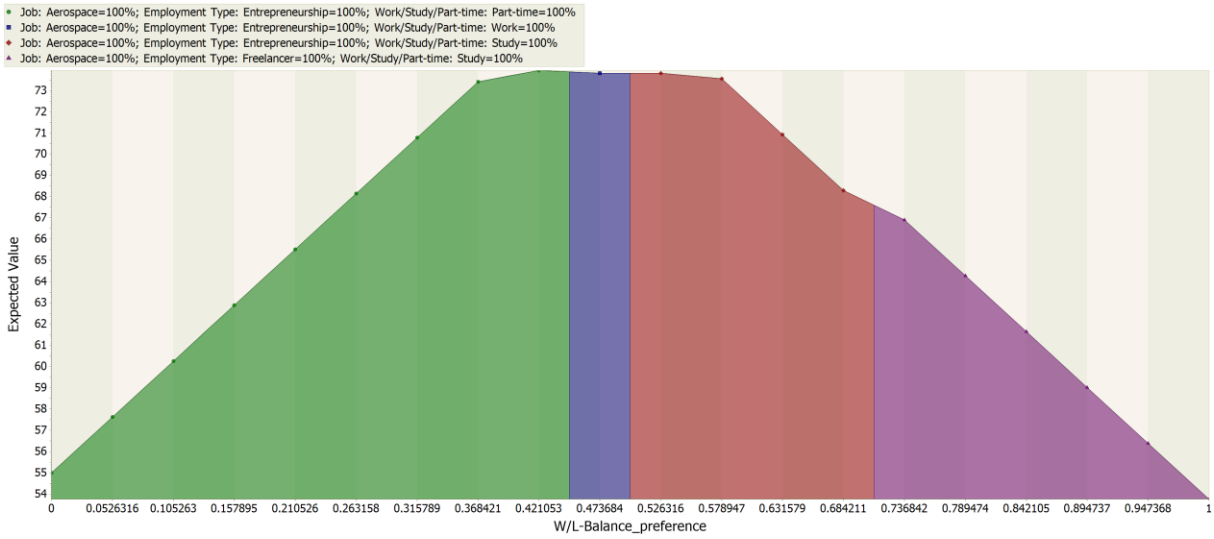

Figure 24: W/L-Balance Preference Sensitivity Expression Focus.

This makes sense because by sacrificing some life to work as an entrepreneur the decision maker maximizes satisfaction from the self-expression potential gained through the entrepreneurship. Figure 24 also shows that this significant satisfaction gain is highest for a work-life balance preference of 0.36 to 0.58.

This means that in this case a decisionmaker who has a more balanced work-life balance preference will get more satisfaction than someone with an unrealistically high or low work-life balance preference.

As expected Figure 25 shows that with a higher importance on employment chance (>0) the model suggests Computational Engineer over the other jobs as it has the best compatibility with the UiS computational engineering master´s program and therefore gives the highest preparedness level and thus the highest employment chance.

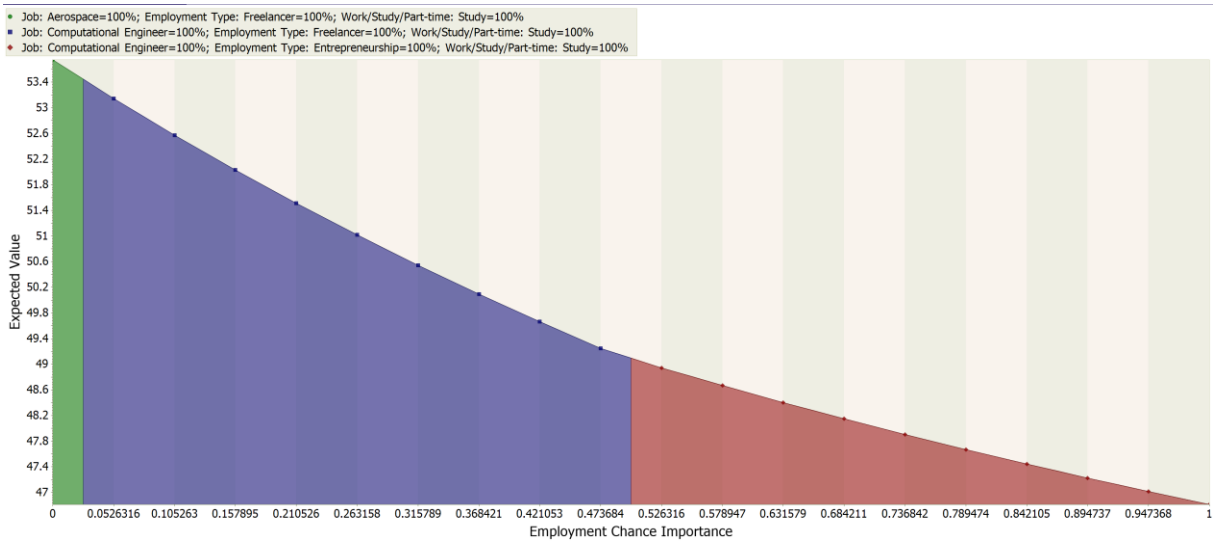

Figure 25: Employment Chance Importance Sensitivity Expression Focus.

Note that with a sufficiently high importance on employment chance (>0.5) the model suggests entrepreneurship over freelance work as an entrepreneur is his own employer and has more control over whom he wants to work for.

5.5 René König

Figure 26 displays the policy tree for René König, a current first year computational engineering student from UiS with a high interest in aerospace engineering and a Mediator (INFP-T) personality type according to the Myers Briggs Personality test. [2]
As part of his personality his satisfaction primarily lies in self-expression with an assigned importance of 0.85 and work-life balance alignment (0.8) while employment chance (0.7), salary (0.5) and initial income (0.65) are less important. His work-life balance preference is relatively high at 0.8, meaning he prefers a focus on life over a focus on work. His personal motivation is at 0.9 and his personal confidence at 1. His expected final grade is 0.8. His highest job preference lies in Aerospace (0.95) closely followed by R & D Engineer with Python skills (0.9) and his lowest job preference lies in Project Engineer (0.3).
Figure 26 shows that the best career path decision is to work as an Aerospace freelancer (56.8%). This makes sense as it provides a high self-expression potential and potential to focus on life. Other viable jobs include R & D Engineer with python skills (56%) and AI / ML (55.5%).
Note that the overall satisfaction of the optimal path is relatively low (56.8%) and not a lot lower for other career path alternatives (54.6% - 54.2%) and most career path and employment type combinations (50.7% - 56%, with the exception of “Study and then become an Employee” at 41%).
This is comparable to “5.1 Neutral Base Case” and could lead to the interpretation that the decision maker maybe still is not very clear about what he wants from his future career.
Another possible interpretation is, that the preferences he has allow him to find equal amount of base-satisfaction in multiple career choices, but he is unlikely to find truly fulfilling satisfaction from his career and has to get it from other sources of satisfaction in life, such as creativity, family and social interactions.
This last interpretation makes sense, because he has a high preference for focusing on life rather than work and this has a high importance for his satisfaction.

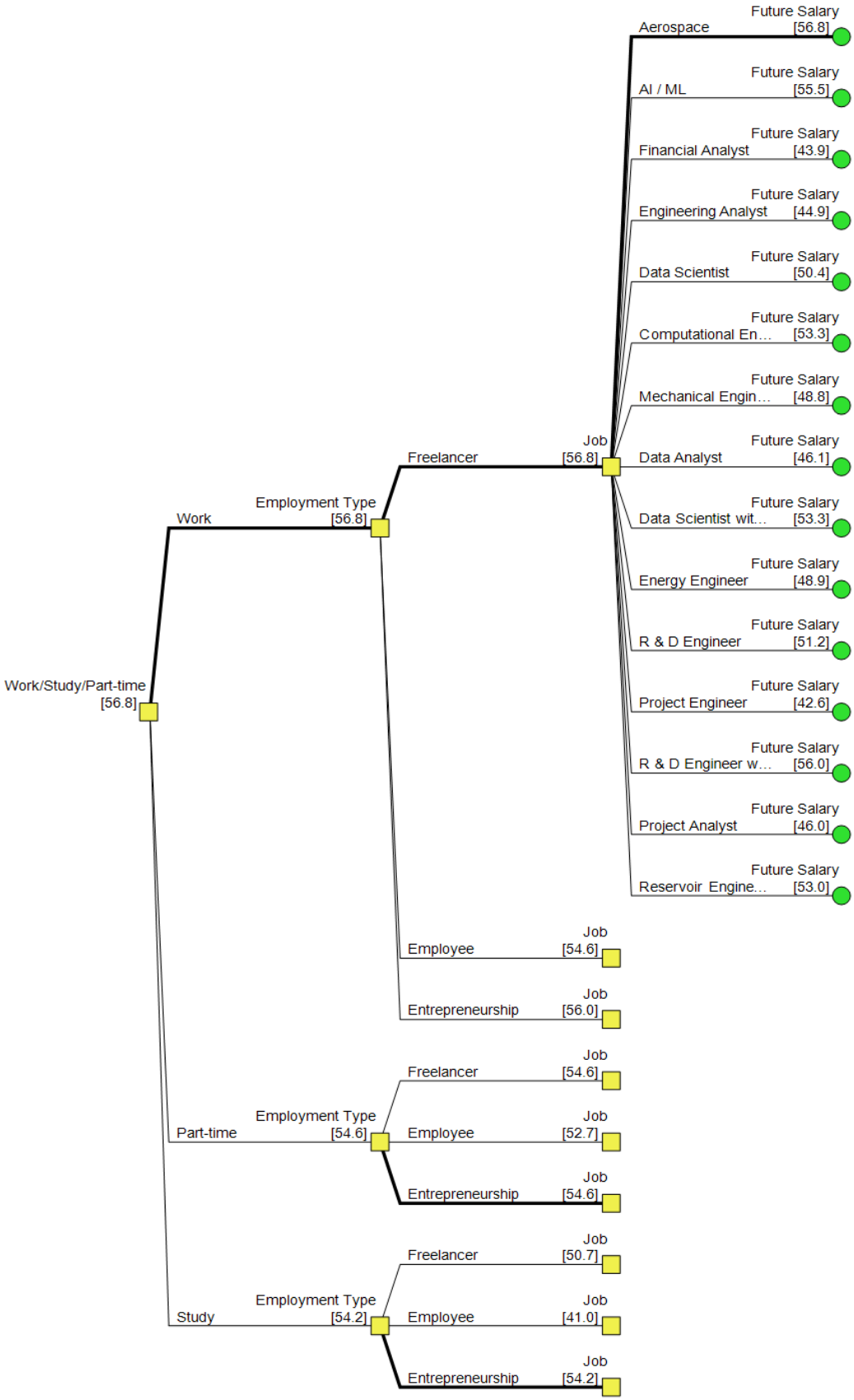

Figure 26: Policy Tree René König.

Figure 27 shows that the model suggests working as an entrepreneur in Aerospace if the need for initial income is below 0.6 to 0.45, depending on the salary importance.
It also suggests that if his need for initial income is below 0.5 to 0.35, depending on the salary importance, studying aerospace engineering full time first and becoming an entrepreneur in that field afterwards is a viable option aswell.

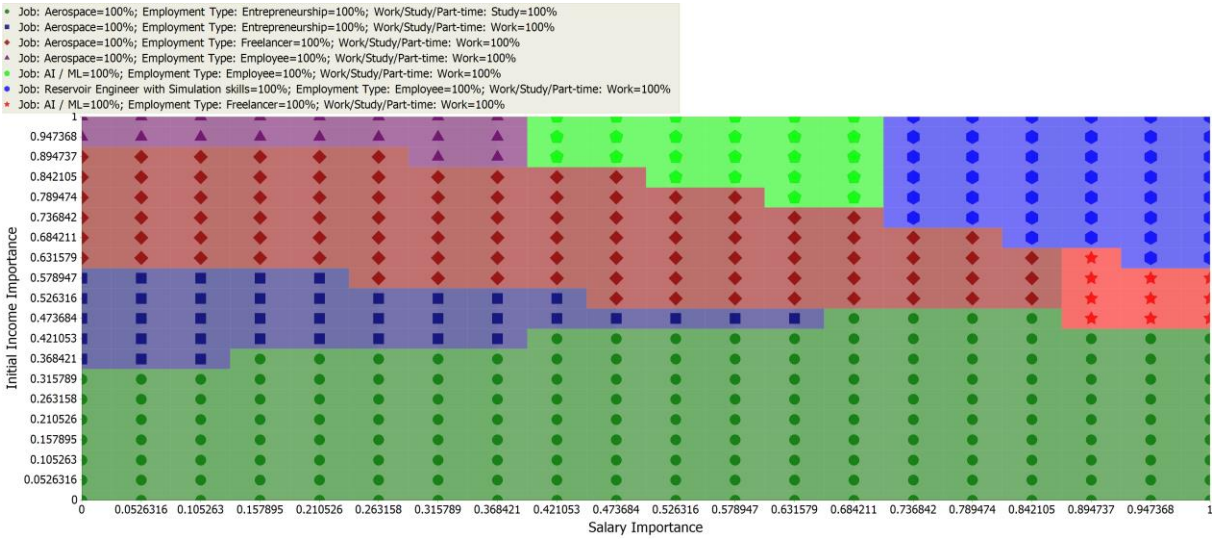

Figure 27: Initial Income and Salary Importance Sensitivity René König.

It also shows that if his need for initial income is sufficiently high, over 0.9 to 0.65, depending on the salary importance, working as an employee in Aerospace, AI / ML or Reservoir Engineer with Simulation skills respectively are viable options, depending on the salary importance.
Lastly it shows that working as an AI / ML freelancer is a viable option if his salary importance is high enough and his need for initial income is between 0.45 and 0.6.

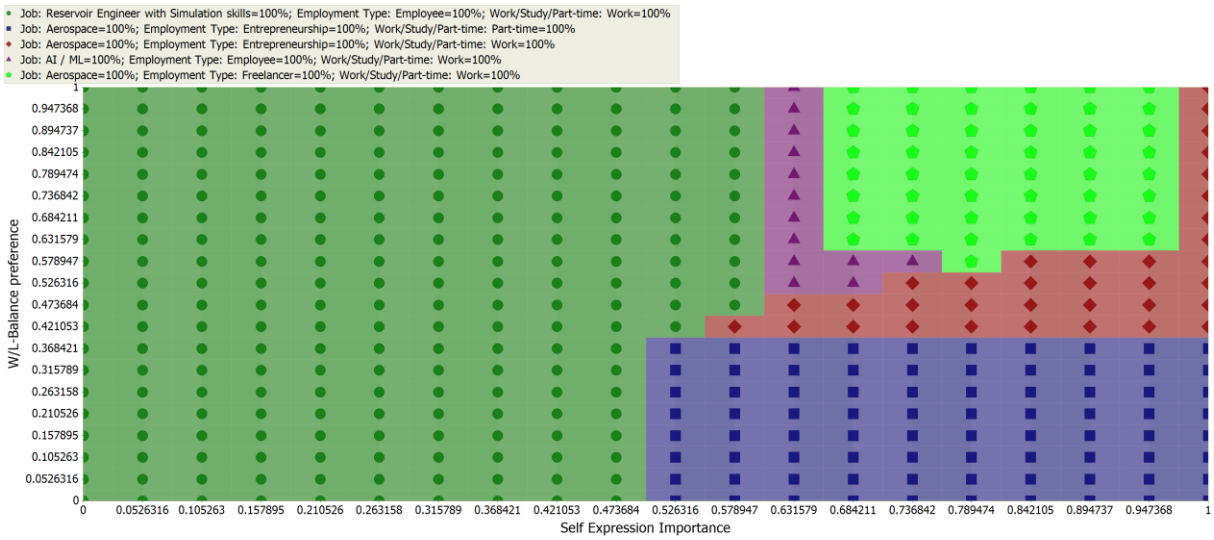

Figure 28: W/L-Balance Preference and Self Expression Importance Sensitivity René König.

Figure 28 shows that if his self-expression importance is below 0.5 to 0.6, depending on his work-life balance preference, working as an employed Reservoir Engineer with Simulation skills becomes the best option, since it features the best combination of employment chance and future salary, which at that point become more important to the satisfaction than self-expression. It also shows that for a high self-expression importance (>0.5) and low work-life balance preference (<0.4) part-time working and studying as an Aerospace Engineer becomes the best option.

5.6 Atanu Das

Figure 29 displays the policy tree for Atanu Das, a current first year computational engineering student from UiS with a high interest in AI / ML and a Logician (INTP-T) personality type according to the Myers Briggs Personality test [2]

As part of his personality his satisfaction primarily lies in self-expression with an assigned importance of 0.8, employment chance (1) and initial income (0.8) while salary (0.6) and work-life balance alignment (0.5) are less important.

His work-life balance preference is relatively balanced at 0.6, meaning he prefers a balanced work-life balance over a focus on life or work. His personal motivation is at 1 and his personal confidence at 0.8. His expected final grade is 0.8. His highest job preference lies in AI / ML (0.8) closely followed by Engineering Analyst, Data Scientist with AI skills, Energy Engineer, Computational Engineer and R & D Engineer with Python skills (0.7) and his lowest job preference lies in Project Engineer (0.3).

Figure 29 shows that the best career path decision is to work as an AI/ML Engineer as employee (54.5%). This makes sense as it provides a high self-expression potential and potential to focus on work. Other viable jobs include Reservoir Engineer with Simulation skills (53.3%) and Data Scientist with AI skills (53%).

Note that the overall satisfaction of the optimal path is relatively low (54.5%) and not a lot lower for other employment type alternatives (51.4% - 53.3%) and even part-time and different employment type combinations (51% - 52.4%).

This is comparable to “5.1 Neutral Base Case” and could lead to the interpretation that the decision maker maybe still is not very clear about what he wants from his future career.

Studying is a less attractive career path at 48.4%, which makes sense as initial income has a high importance to him.

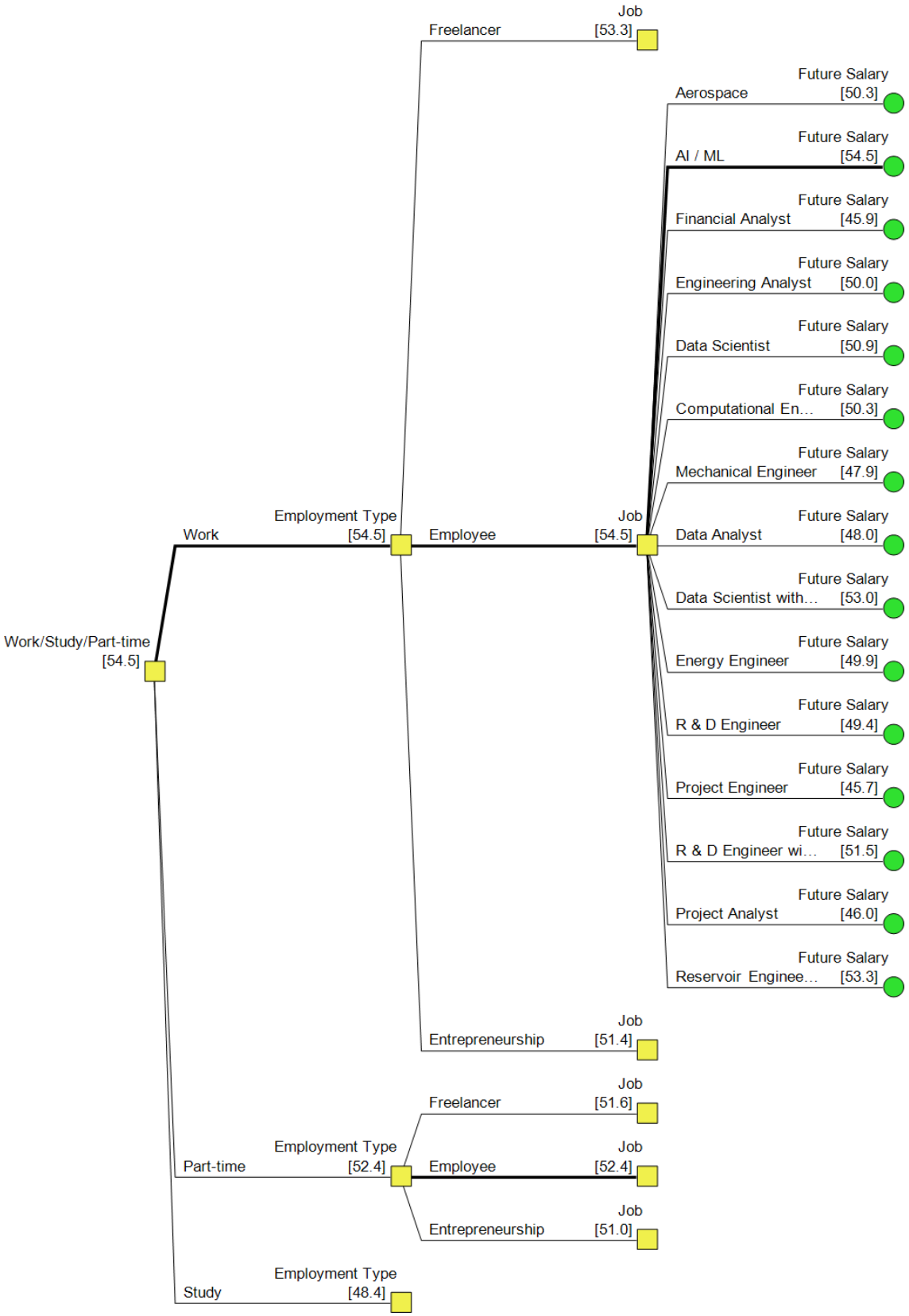

Figure 29: Policy Tree Atanu Das.

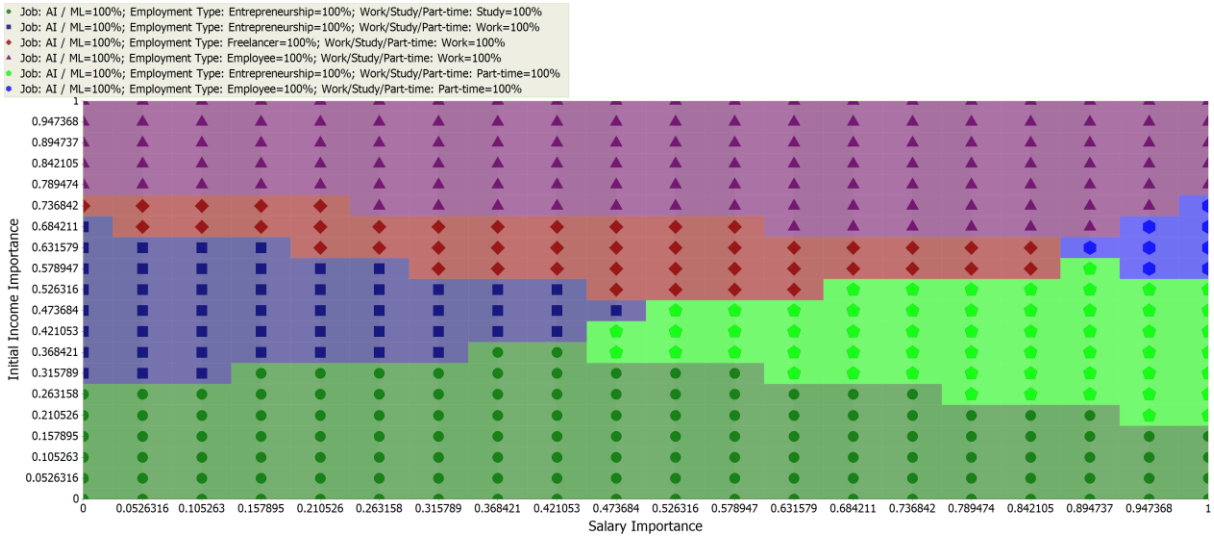

Figure 30: Initial Income and Salary Importance Sensitivity Atanu Das.

Figure 30 shows that the model suggests working as an AI/ML is always the priority for him, independent of Initial Income and salary importance. Higher Initial Income importance suggests working as a freelancer or employee while lower Initial Income importance suggests studying and becoming an entrepreneur afterwards.

Low Salary importance at a balanced Initial Income importance suggests working as an entrepreneur full time while higher Salary importance suggests studying part-time as an entrepreneur, or employee if the Initial Income Importance is higher.

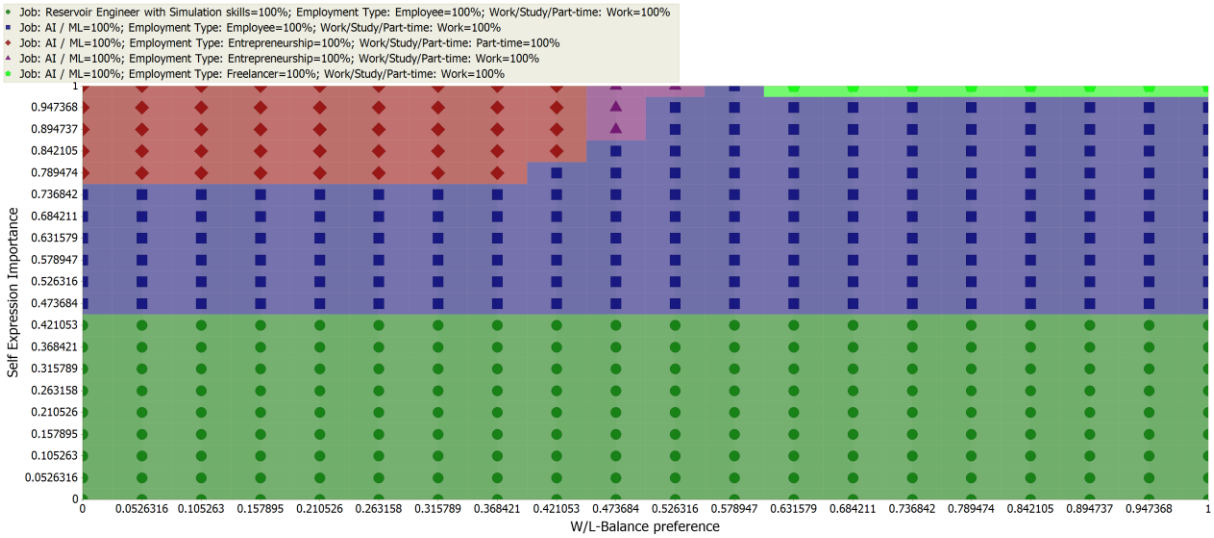

Figure 31: W/L-Balance Preference and Self Expression Importance Sensitivity Atanu Das.

Figure 31 shows that if his self-expression importance is below 0.75 to 1, depending on his work-life balance preference, working as an employed AI / ML Engineer is the best option. Below 0.45 working as an employed Reservoir Engineer with Simulation skills becomes the best option, as it features the best combination of employment chance and future salary, which at that point become more important to the satisfaction than self-expression. Above 0.75 to 1 part-time or full time entrepreneurship or even freelance work in AI / ML, depending on his work-life balance preference, become the best option.

6 Model Appraisal (decision quality)

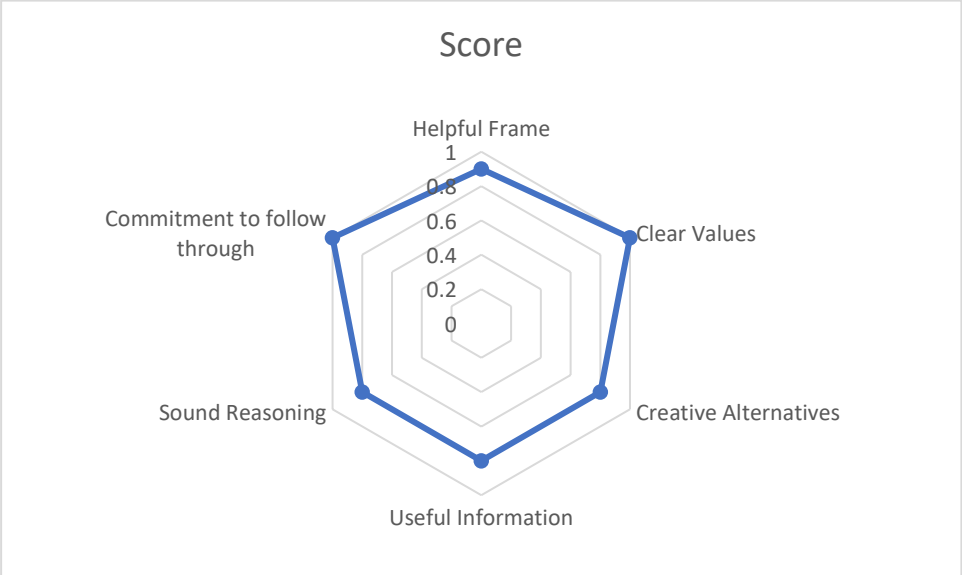

Figure 32: Decision quality.

Figure 32 displays the six basic elements for the appraisal of the decision quality.

6.1 Helpful frame

In our model, the problem, vision, purpose, long & short-term goals are specific and have been discussed over a wide range of aspects. The factors and difficulties are addressed properly while the framework is prepared by head and heart issues in such a way that it can be implemented to a specific group which has already been tested and appraised by fellow M.Sc. students of Computational Engineering at UiS. We have narrowed down some options to some extent to get reduce complexity, but the purpose, scope and perspectives are shaped clearly so we marked ourselves 0.9 out of 1.

6.2 Clear Values

The model is designed in a perfect way that it can depict the preference consequences of one alternative over the others. Our model is properly emphasized in both long & short term, which helps in clarifying the values to make quality decisions. The terms that represent ‘want’ & ‘dislike’ are defined while willingness of leaving the ‘want’ to reduce the effect of ‘dislike’ is also considered in the preference and importance values, so we marked ourselves the full score in this section.

6.3 Creative Alternatives

Almost all the considered alternatives are distinct from each other, realistic and potentially captivating. In some cases similar job alternatives have been chosen to examine the impact of smaller differences. The chosen alternatives have been selected with creativity and the pragmatic background in mind. Tools like brainstorming and mind-maps and diverse resources and discussions with peers have been used to choose the alternatives. There are of course more possible alternatives in the job decision that have not been implemented to keep the model complexity low enough to finish the project in the given timeframe. Therefore, the model is marked 80% in the field of creative alternatives.

6.4 Useful Information

In our model, factual information from credential sources have been used to anticipate the results of the chosen alternatives as in the future salary where uncertainty is also accounted for through probabilistic evaluation. We could have done better in networking in terms of talking to experts regarding the alternatives. Also, in some cases, uncertainty is avoided to reduce model complexity and due to the lack of necessary information to evaluate it. Overall, we think 80% is the appropriate score for this useful information section.

6.5 Sound Reasoning

In our model, the combination of the considered alternatives, factual information and values have been used logically to reach into a decision which proves its validation. Decision & probability trees, influence diagram, pros and cons of the chosen alternatives have been considered here in the model to improve its competence. But in some cases, difficulties and uncertainty have been excluded from the model to reduce it´s complexity and complete the project within the assigned time frame. So, from our side, we believe this section is worth an 80% score.

6.6 Commitment to follow through

We are ready to execute this decision model meticulously as this model is about the future of the M.Sc. student of Computational Engineering. We are also aware about the uncertainty and obstacles which will help us to sort out these problems to reach into our decision. That will eventually help us to anticipate the potential

consequences on choosing the alternatives. Proper implementation plan and progress measurement are possible by following this model. So, logically this section demands 100% score because of its preciseness.

7 Consideration of Other Factors (If any)

Instead of limiting the model to students expecting to receive their master´s degree in computational engineering at UiS it should be generalized even further to better work for students in different programs at different universities.

To achieve this the “Compatibility with UiS CE Master” value node should be changed into “Compatibility with personal study program” and the job list should be extended to feature a bigger variety of jobs. This requires more research on salaries for those jobs and more personal input parameters in the “Job Preferences” and new “Compatibility with personal study program” node.

To avoid this presets for different study programs could be created, that could be further customized if necessary.

8 Recommendations & Conclusions

The model is a general model that can be personalized to produce useful career path suggestions for students studying computational engineering at UiS. Working with the model generates insight into the different career path alternatives and their benefits and weaknesses in accordance with the personal input parameters.

When using the model it is recommended to define the personal input parameters as precise as possible between 0 and 1 while avoiding to set them to 0 or 1 unless there is absolute certainty about the implications of that.

When receiving the result with the suggested career path it is recommended to not take it as a strong given but consider alternatives with similar expected satisfaction values as well and use rainbow diagrams to do sensitivity analysis on the personal input parameters. By doing so one can find unexpected alternative career paths that might work out well when one is willing to adjust his personal input parameters slightly or solidify one´s chosen career path as the right choices.

References

[1] I. PayScale, “Payscale,” 2021. [Online]. Available: https://www.payscale.com/research/US/Country=United_States/Salary. [Accessed 18 November 2021].

[2] N. A. Limited, “16Personalities,” 2021. [Online]. Available: https://www.16personalities.com/free-personality-test. [Accessed 09 December 2021].

Appendix

A1: DPL File containing the model and What-if cases