**Project Report**

**“B-Healthy” Expert System**

* Project description:

This is an expert system designed to help with an individual’s diet and provide personalized nutrition recommendations. It automates the basic assessment questionnaire that patients are often asked at the beginning of their dietitian appointment, such as gender, BMI, age, eating habits and main reason for the visit. It then provides advice tailored to the needs and/or health goals of the patient.

* Method Used

We are representing the solution as a path from a start state to a goal state. To find answers we use the facts provided by users and different rules in working memory until we find a matching condition.

* Justifications:

This technology will help patients to improve their eating habits and meet their nutritional needs. It also helps dietitians save time by prioritizing areas of nutritional need and bypassing simple questions that don’t necessitate face-to-face interaction. The expert system can also reduce the cost of the nutrition consultation because dietitians would be able to address the problem and give the necessary advice in less time. In many cases patients may not even need to see a dietitian after the assessment because this system can guide them on how to reach their goals by suggesting simple and personalized changes to their diet. This system also ensures the patient receives sound evidence-based nutrition information rather than unscientific or potentially dangerous information they may find on the internet.

* Design Issues

For the most part the design process went pretty smoothly. The only section we had to spend more time on was designing the different layers of rules and narrowing it down to get to the final goal.

* Implementation Details

First, we start with the basic askable information to find out about the primary reasons of the visit such as weight loss, high blood pressure, diabetes, bone health, and cholesterol. Then the first set of rules narrow the search down to a more specific problem. The second layer of rules finalizes the decision based on the first layer of rules and more detailed askable information.

* Difficulties Encountered

Overall, we did not face too many difficulties because the instruction was very straight forward and we had a exshell as a template to follow. The only issue was trying to cover all the different possible cases in order to not get “false” as a result, which we finally did.

* Performance Analysis

During the four visits we had with the expert dietician, we double checked all the confidential facts and were able to confirm all the results to be as accurate as possible. Thus, this system is both tested and approved by our expert dietitian.

* Result Significance

The results we achieved are significant for use in practice based on the expert dietician evaluation.

* Possible Enhancements

From our expert’s personal professional experience working in an outpatient clinical setting, we have covered approximately 94% of dietary related health issues that most commonly account for a patient’s visit with the dietitian. However, there remains about 6% of health issues that would benefit from nutrition advice such as kidney stones, gout, irritable bowel syndrome (IBS), inflammatory bowel disease (Crohn’s disease or ulcerative colitis), renal disease, anemia, food intolerances/allergies, etc. which can be taken care of in the future enhancement.

* Future Work

In the future, we can combine this expert system with disease diagnosis machine learning systems to cover a broad range of problems that patients would visit a doctor for. This system could, for instance, be useful in clinic or hospital waiting rooms. Ultimately, utilization of the expert system may help reduce patient load for physicians as it will be able to provide nutrition recommendations, thereby saving time and money for the doctor and patients during appointments.