

RESEARCH: DIGITAL TECHNOLOGY THAT TAKES INTO ACCOUNT PERSONAL NORMS AND VALUES



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NORMS & VALUES

CHALLENGES



IF DIGITAL TECHNOLOGY CAN MODEL ASPECTS OF OUR PERSONAL NORMS AND VALUES, IT CAN TAILOR ITS SUPPORT ACCORDINGLY. FOR EXAMPLE, IF THE TECHNOLOGY KNOWS THAT MY HEALTH IS TOP-PRIORITY, IT MAY ADVISE RESCHEDULING SOME APPOINTMENTS IN AN OVERLY BUSY WEEK. AND IF IT IS RAINING, IT WILL NOT ADVISE GOING OUTSIDE TO EXERCISE IF SOMEONE IS PRONE TO CATCHING A COLD. TO SOMEONE WITH LOW VISION WHO VALUES INDEPENDENCE, IT WILL ADVISE A ROUTE WHERE LITTLE EXTRA HELP IS NEEDED TO FIND THEIR WAY.

IT IS RAINING, DO NOT GO OUT FOR EXERCISE, OTHERWISE YOU MAY CATCH A COLD



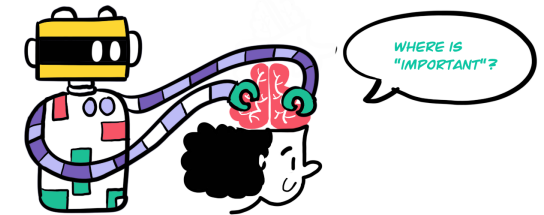
BEHAVIOUR

ADVICE

HEALTH

PEOPLE AND SITUATIONS DIFFER: WHAT IS IMPORTANT DIFFERS FROM PERSON TO PERSON AND ACROSS SITUATIONS. IN A **CARING AND INSPIRING** DIGITAL SOCIETY, TECHNOLOGY TAKES THIS DIVERSITY INTO ACCOUNT. TECHNOLOGY WILL BE ABLE TO ADAPT TO PERSONAL NORMS AND VALUES SO THAT WE HAVE THE FREEDOM TO SHAPE OUR LIVES WITH TECHNOLOGY IN ACCORDANCE WITH WHAT WE FIND IMPORTANT.

IT IS CHALLENGING FOR A MACHINE TO TAKE INTO ACCOUNT WHAT PEOPLE CARE ABOUT:



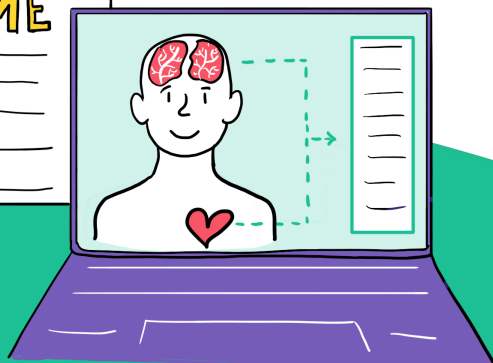
- * OUR BEHAVIOUR DOES NOT ALWAYS REFLECT OUR NORMS AND VALUES
- * PEOPLE ARE NOT ALWAYS AWARE OF WHAT THEY CONSIDER IMPORTANT
- * VALUES ARE ABSTRACT AND THEREFORE OFTEN DIFFICULT TO NAME AND DEFINE

THE INTERPRETATION OF NORMS AND VALUES CAN DIFFER ACROSS SITUATIONS

- * HOW STRICTLY SHOULD AN AGREEMENT BE ENFORCED?
- * HOW DOES CONTEXT AFFECT WHICH VALUES ARE PROMOTED?

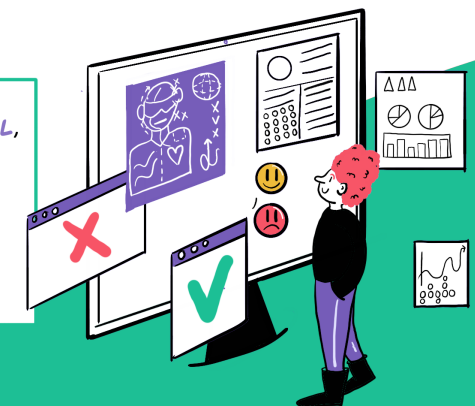
NAME

address
day
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occasion



THE MORE WE CAN **EXPRESS** WITH A **COMPUTATIONAL MODEL**, THE HARDER IT OFTEN IS FOR A MACHINE TO REASON WITH IT, AND THE HARDER IT IS FOR A HUMAN TO UNDERSTAND AND ADJUST THE MODEL:

- * SPECIFICATIONS CAN BE INCONSISTENT, I.E. THEY CONTAIN CONTRADICTIONARY INFORMATION
- * CONCEPTS ARE INTERRELATED, E.G. NORMS ARE A WAY OF REALISING VALUES.



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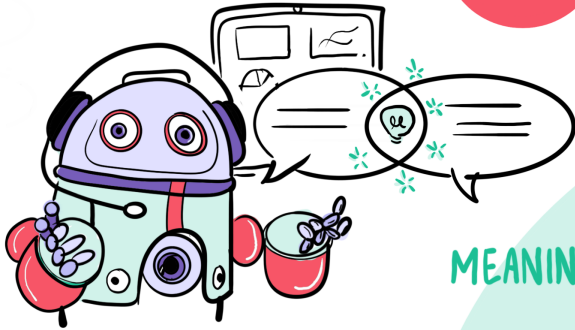


APPROACH

PEOPLE AT THE CENTRE

RESULTS CORESAEP (I)

HOW?



MEANINGFUL MODELS

1.

THE MACHINE SHOULD HAVE KNOWLEDGE OF WHAT THE USER CONSIDERS IMPORTANT (USER MODEL) AND WHAT IS IMPORTANT IN A SITUATION (SITUATION MODEL). AND THIS KNOWLEDGE MUST BE CAPTURED IN THE MACHINE SO THAT THE USER CAN UNDERSTAND AND ADJUST IT. TO REALIZE THIS, THE CONCEPTS IN THE MODELS MUST BE CONNECTED IN MEANINGFUL WAYS AND ALIGNED WITH HUMAN CONCEPTS.

MEANINGFUL

IN CONVERSATION WITH MACHINES

2.

WE START FROM THE PREMISE THAT MACHINES CANNOT GRASP EVERYTHING THAT IS IMPORTANT TO PEOPLE. WE CAN DEAL WITH THIS BY ENSURING THAT HUMANS AND MACHINES CAN TALK TO EACH OTHER ABOUT WHAT IS IMPORTANT TO SOMEONE AND HOW TO ASSESS A SITUATION. THAT WAY, THE MACHINE'S MODELS CAN CONTINUOUSLY BE ADJUSTED AND ADAPTED TO A DIFFERENT PERSON OR SITUATION.

INTERACTIVE



HUMAN GROUNDED

HUMAN-CENTRED APPROACH

WE LAY THE **FOUNDATION** FOR OUR RESEARCH BY BUILDING ON RESULTS FROM THE SOCIAL SCIENCES AND BY CONDUCTING EXPLORATORY USER STUDIES. THE TECHNIQUES WE DEVELOP ARE THUS BASED ON INSIGHTS ABOUT HOW PEOPLE THINK AND ASSESS SITUATIONS AND WHAT THEY CONSIDER IMPORTANT.

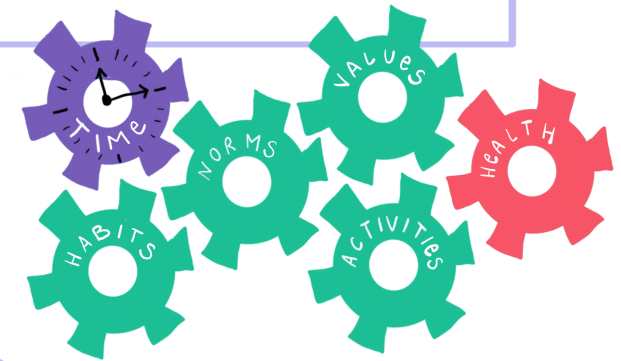
3.

IN THE **SPECIFICATION** OF MODELS, WE USE CONCEPTS THAT ARE MEANINGFUL TO PEOPLE.

IN THE **EVALUATION** OF OUR DEVELOPED TECHNIQUES, WE CONSIDER NOT ONLY TECHNICAL MEASURES SUCH AS THE ACCURACY OF PREDICTIONS, BUT ALSO UNDERSTANDABILITY, USABILITY, AND ALIGNMENT WITH PEOPLE.

> USER MODELS FOR CAPTURING

- * USER ACTIVITIES, NORMS, AND VALUES, AND THEIR INTERRELATIONS
- * (DESIRED) HABITS OF THE USER
- * TEMPORAL ASPECTS OF THE USER'S DAILY ACTIVITIES, E.G. DURATION, TIME, AND ORDER OF ACTIVITIES
- * SOCIAL AGREEMENTS BETWEEN USERS



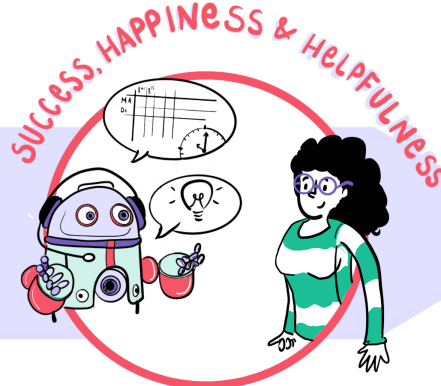
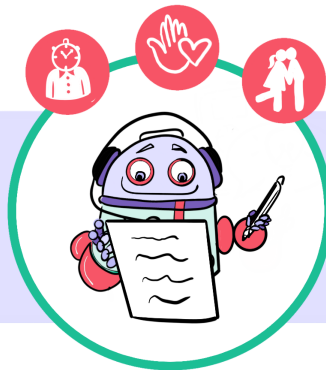
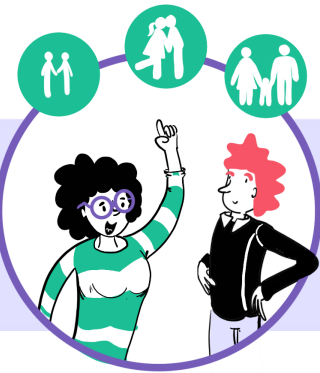
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RESULTS CORESAEP

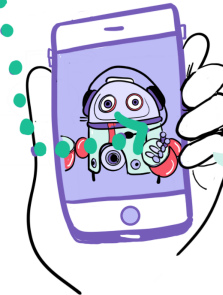
> **MODEL THAT ALLOWS THE MACHINE** TO INTERPRET WHAT A **SOCIAL SITUATION** MEANS TO THE USER.

THIS IS DONE IN **3** STEPS:



> **SOFTWARE** THAT CAN BE IN CONVERSATION WITH A USER
THE **DIALOGUE AGENT** ASKS WHAT THE USER'S DAILY ACTIVITIES LOOK LIKE AND WHAT VALUES ARE PROMOTED OR DEMOTED.

WE STUDIED HOW A DIALOGUE AGENT CAN HAVE A CONVERSATION WITH SOMEONE WITH A VISUAL IMPAIRMENT TO FIND OUT THE WAYS IN WHICH THIS PERSON FINDS HER WAY TO, SAY, THE DOCTOR OR WORK. DIFFERENT ROUTES CAN PROMOTE OR DEMOTE DIFFERENT VALUES, SUCH AS FRESH AIR, SAFETY, OR INDEPENDENCE. DEPENDING ON THE NATURE OF THE IMPAIRMENT, THE PERSON MAY TRAVEL SOME PARTS OF THE ROUTE INDEPENDENTLY, AND OTHER PARTS MAY REQUIRE ASSISTANCE. WE HAVE SHOWN WHICH KINDS OF MISUNDERSTANDINGS CAN ARISE IN SUCH A CONVERSATION BETWEEN HUMAN AND MACHINE, FOR EXAMPLE BECAUSE THE USER DOES NOT PROPERLY UNDERSTAND THE CONCEPTS OR THE STRUCTURE OF THE MODEL USED BY THE MACHINE TO CAPTURE THE INFORMATION FROM THE USER. TO AVOID MISUNDERSTANDINGS THE USER MODEL CAN FOR EXAMPLE BE SIMPLIFIED IN A WAY THAT ALIGNS WITH THE PURPOSE OF THE APPLICATION.



PERCEPTION

COLLECTING **INFORMATION** ON THE NATURE OF THE SOCIAL RELATIONSHIP BETWEEN THE USER AND SOMEONE ELSE IN THE SITUATION (WITH WHOM FOR EXAMPLE, THE USER HAS AN APPOINTMENT), E.G. THE RELATIONSHIP QUALITY, HOW WELL THEY KNOW EACH OTHER, OR WHAT ROLE SOMEONE HAS.

INTERPRETATION

BASED ON THE SOCIAL FEATURES OF THE SITUATION, A SITUATION PROFILE IS MADE ON THE BASIS OF SO-CALLED '**PSYCHOLOGICAL CHARACTERISTICS**' OF THE SITUATION. THIS MAY INCLUDE, FOR EXAMPLE TO WHAT EXTENT A TASK HAS TO BE PERFORMED (DUTY), TO WHAT EXTENT INTELLECTUAL ABILITIES ARE REQUIRED, TO WHAT EXTENT IT WILL BE A POSITIVE AND PLEASANT SITUATION OR RATHER ONE THAT INVOLVES A LOT OF STRESS, ETC.

PROJECTION

ON THE BASIS OF THE SITUATION PROFILE IT IS DEDUCED WHAT IS EXPECTED OF THE USER IN THAT SITUATION (E.G. WHICH MEETING THE USER WOULD ATTEND IN THE CASE OF OVERLAPPING APPOINTMENTS) OR WHICH VALUES IN THE SITUATION ARE PROMOTED OR DEMOTED (E.G. SUCCESS, HELPFULNESS, OR ENJOYMENT). WE HAVE SHOWN THAT THE SITUATION PROFILE IS A **BETTER PREDICTOR OF THE PRIORITY PEOPLE GIVE TO OVERLAPPING APPOINTMENTS** THAN INFORMATION ABOUT THE NATURE OF THE SOCIAL RELATIONSHIP.

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