Dozy, a sleep forecast web app

Dozy is a web app that forecasts how long someone will sleep the next night. The user uploads an Apple Health export and answers four short questions, and Dozy shows the forecast in hours and minutes.

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Created on: November 13, 2026 12:10 PM
Changed on: November 13, 2026 12:16 PM

Context of use: Education
Level of education: Bachelor

Technology Impact Cycle Tool

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Impact on society

What impact is expected from your technology?

This category is only partial filled.

What is exactly the problem? Is it really a problem? Are you sure?

Many people do not know how long they will sleep tonight, and sleep trackers only show what already happened. Dozy gives people a forecast for the coming night, so they can see if a short or long night is coming and plan around it. For most people this is a small problem, not a serious one. Doctors and sleep coaches can help with real sleep problems much better than an app can. Dozy mostly helps people understand their own sleep pattern.

Are you sure that this technology is solving the RIGHT problem?

This question has not been answered yet.

How is this technology going to solve the problem?

This question has not been answered yet.

What negative effects do you expect from this technology?

This question has not been answered yet.

In what way is this technology contributing to a world you want to live in?

This question has not been answered yet.

Now that you have thought hard about the impact of this technology on society (by filling out the questions above), what improvements would you like to make to the technology? List them below.

This question has not been answered yet.

Hateful and criminal actors

What can bad actors do with your technology?

This category is only partial filled.

In which way can the technology be used to break the law or avoid the consequences of breaking the law?

Dozy does not store any data and has no accounts, so the risk is low. Someone could still misuse it. A person could upload the Health export of a partner or family member without asking and look at their sleep and heart rate. That would invade their privacy. An employer or an insurance company could also use sleep forecasts to judge people, which is unfair and in some cases illegal.

Can fakers, thieves or scammers abuse the technology?

This question has not been answered yet.

Can the technology be used against certain (ethnic) groups or (social) classes?

This question has not been answered yet.

In which way can bad actors use this technology to pit certain groups against each other? These groups can be, but are not constrained to, ethnic, social, political or religious groups.

This question has not been answered yet.

How could bad actors use this technology to subvert or attack the truth?

This question has not been answered yet.

Now that you have thought hard about how bad actors can impact this technology, what improvements would you like to make? List them below.

This question has not been answered yet.

Privacy

Are you considering the privacy & personal data of the users of your technology?

This category is only partial filled.

Does the technology register personal data? If yes, what personal data?

Yes. Dozy reads health data. From the Apple Health export, Dozy reads sleep times, resting heart rate and the gender in the Health profile. The user also fills in sleep type, morning freshness and morning readiness. Dozy handles all of this on the users own computer. It does not save the export and does not keep a history of forecasts. It has no accounts, no tracking and no analytics.

Do you think the technology invades the privacy of the stakeholders? If yes, in what way?

This question has not been answered yet.

Is the technology is compliant with prevailing privacy and data protection law? Can you indicate why?

This question has not been answered yet.

Does the technology mitigate privacy and data protection risks/ concerns (privacy by design)? Please indicate how.

This question has not been answered yet.

In which way can you imagine a future impact of the collection of personal data?

This question has not been answered yet.

Now that you have thought hard about privacy and data protection, what improvements would you like to make? List them below.

This question has not been answered yet.

Human values

How does the technology affect your human values?

This category is only partial filled.

How is the identity of the (intended) users affected by the technology?

Dozy gives people a number about their own body. Some people may start to see themselves as a bad sleeper because of it. If the forecast says 6 hours, someone might feel worried before the night even starts. The gender question only offers male and female, so people who do not fit those options may feel left out. On the positive side, Dozy can help people understand their sleep and feel more in control.

How does the technology influence the users' autonomy?

This question has not been answered yet.

What is the effect of the technology on the health and/or well-being of users?

This question has not been answered yet.

Now that you have thought hard about the impact of your technology on human values, what improvements would you like to make to the technology? List them below.

This question has not been answered yet.

Stakeholders

Have you considered all stakeholders?

This category is only partial filled.

Who are the main users/targetgroups/stakeholders for this technology? Think about the intended context by answering these questions.

Name of the stakeholder
People who are interested in their own health, between ages of 20-40

How is this stakeholder affected?
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Did you consult the stakeholder?
No

Are you going to take this stakeholder into account?
No

Did you consider all stakeholders, even the ones that might not be a user or target group, but still might be of interest?

-

Now that you have thought hard about all stakeholders, what improvements would you like to make? List them below.

This question has not been answered yet.

Data

Is data in your technology properly used?

This category is only partial filled.

Are you familiar with the fundamental shortcomings and pitfalls of data and do you take this sufficiently into account in the technology?

Yes. The model learned from only 14 people in the PMData dataset, so it cannot represent everyone. A lot of the data comes from self reports, and every person answers those in their own way. Some nights had no report, and I had to fill in those gaps with estimates. The model finds patterns, not causes. Sleep also depends on things the data does not show, like alarms, stress or plans.

How does the technology organize continuous improvement when it comes to the use of data?

This question has not been answered yet.

How will the technology keep the insights that it identifies with data sustainable over time?

This question has not been answered yet.

In what way do you consider the fact that data is collected from the users?

This question has not been answered yet.

Now that you have thought hard about the impact of data on this technology, what improvements would you like to make? List them below.

This question has not been answered yet.

Inclusivity

Is your technology fair for everyone?

This category is only partial filled.

Will everyone have access to the technology?

This question has not been answered yet.

Does this technology have a built-in bias?

Yes. Most PMData participants are men, so the model probably works better for men than for women. The participants are a small group of adults from one research project in Norway, with fairly similar lives. People with night shifts, young children or irregular schedules do not appear in the data, so the forecast may be wrong for them.

Does this technology make automatic decisions and how do you account for them?

This question has not been answered yet.

Is everyone benefitting from the technology or only a a small group? Do you see this as a problem? Why/why not?

This question has not been answered yet.

Does the team that creates the technology represent the diversity of our society?

This question has not been answered yet.

Now that you have thought hard about the inclusivity of the technology, what improvements would you like to make? List them below.

This question has not been answered yet.

Transparency

Are you transparent about how your technology works?

This category is only partial filled.

Is it explained to the users/stakeholders how the technology works and how the business model works?

Partly. The page About the model explains which inputs the model uses and that it learned from Fitbit data. The forecast card shows the average error of about 50 minutes and compares the forecast with the users recent average. The upload window shows which values came from the export and which ones are still missing. Dozy does not explain yet why a forecast is high or low.

If the technology makes an (algorithmic) decision, is it explained to the users/stakeholders how the decision was reached?

This question has not been answered yet.

Is it possible to file a complaint or ask questions/get answers about this technology?

This question has not been answered yet.

Is the technology (company) clear about possible negative consequences or shortcomings of the technology?

This question has not been answered yet.

Now that you have thought hard about the transparency of this technology, what improvements would you like to make? List them below.

This question has not been answered yet.

Sustainability

Is your technology environmentally sustainable?

This category is only partial filled.

In what way is the direct and indirect energy use of this technology taken into account?

Dozy uses very little energy. I trained the model once, and the model file is smaller than 1 MB. A forecast takes less than a second on a normal laptop. Dozy runs on the users own computer, so it needs no server or cloud service that runs all day.

Do you think alternative materials could have been considered in the technology?

This question has not been answered yet.

Do you think the lifespan of the technology is realistic?

This question has not been answered yet.

What is the hidden impact of the technology in the whole chain?

This question has not been answered yet.

Now that you have thought hard about the sustainability of this technology, what improvements would you like to make? List them below.

This question has not been answered yet.

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Future

Did you consider future impact?

This category is only partial filled.

What could possibly happen with this technology in the future?
If 100 million people used Dozy, many of them might trust the forecast more than their own feeling. People could start to plan their evening around a number that can be off by about 50 minutes. Some people might even sleep worse because they worry about the forecast. Companies could want the data to sell products or to judge employees. On the positive side, more people could learn about their sleep habits, like the effect of weekends and routines.

Sketch a or some future scenario (s) (20-50 years up front) regarding the technology with the help of storytelling. Start with at least one utopian scenario.
This question has not been answered yet.

Sketch a or some future scenario (s) (20-50 years up front) regarding the technology with the help of storytelling. Start with at least one dystopian scenario.
This question has not been answered yet.

Would you like to live in one of this scenario's? Why? Why not?
This question has not been answered yet.

What happens if the technology (which you have thought of as ethically well-considered) is bought or taken over by another party?
This question has not been answered yet.

Impact Improvement: Now that you have thought hard about the future impact of the technology, what improvements would you like to make? List them below.
This question has not been answered yet.