Cash Reader helps blind people around the world. The banknote reader recognises more than 90 currencies

Two Czech developers, Tomáš Jelínek and Martin Douděra, wanted to do business while also helping people with various health constraints. They looked for a gap in the market and a blind friend brought them the idea of a reader for visually impaired people. They developed the Cash Reader mobile application, which has no competition in the world. The application reads currencies from more than 100 countries and has been translated into 34 languages. CzechInvest’s acceleration program helped the creators of the application penetrate markets as far as Southeast Asia.

The world’s population includes approximately 285 million visually impaired people, 39 million of whom are blind. Recognising a banknote is an entirely common thing for a healthy person, but it can be a major problem for a blind or visually impaired person, who must rely on a third party to verify the type and denomination of a banknote. The Cash Reader mobile application, which is available for both Android and iOS, solves this problem by reading aloud the value and type of banknote immediately upon identifying it, even without internet access.

The Cash Reader application is able to voice the value of banknotes of 91 world currencies and has been translated into 34 languages.
The application has also been adapted for users who are both deaf and blind and thus recognise banknotes by touch rather than visually or by voice. Cash Reader is able to express the value and type of banknote by means of vibration, even when the user’s telephone is in silent mode.

Not an issue for healthy people, but a major problem for the visually impaired

Czech developers Tomáš Jelínek and Martin Douděra decided to start a business two years ago and established the startup Hayaku. They wanted to develop mobile applications for the blind and people with various health constraints. They started to investigate how such people use applications and met with a friend who is blind and has a problem with his fine motor skills. He mentioned to them that he very much missed using banknotes in everyday activities. Jelínek and Douděra did not hesitate and immediately started developing the Cash Reader application for reading banknotes.

Banknote readers already existed at that time, but only for American dollars and euros. „At the beginning, we thought it would be easy, because banknote readers already exist and it would suffice to simply convert them to Czech korunas. However, it was more complicated than that, so we spent more time on it than we had originally planned, and in the end we developed a mobile application that is applicable to other currencies as well,” says Jelínek. The image processing works using deep neural networks, which help to recognise and sort visual stimuli, and the developers test them on their own images. “For each currency, we need more than ten thousand photos. We have to take into account all of the lighting conditions, including darkness and the angles at which the blind can set the banknote. We thus have to have real banknotes, which are difficult to obtain from some countries,” Jelínek explains.

The Cash Reader team is working on the conversion of more currencies.
The Cash Reader application can already be downloaded free of charge in the Czech Republic, as the founders of the startup succeeded in negotiating a partnership with Hello bank, which sponsors the application’s use of the Czech koruna. The startup is now seeking a similar partner also for foreign currencies. It is being assisted in this endeavour by ambassadors in various countries, such as Argentina, Kenya and China. These are people from the local community who are looking for marketing opportunities and partners. “We are in constant communication with the community and we have other applications in mind that we know would suit them. But that requires time and a sufficient amount of money,” Jelínek explains.

The Cash Reader technology has been used by, for example, the Swiss company SICPA, which produces ink and special elements for most countries’ banknotes. In securing banknotes for the central bank of the United Arab Emirates, SICPA decided to go the digital route and approached Hayaku to help protect the country’s currency. They created a twin of the Cash Reader application, where they supplemented its core with Arabic and the central bank’s design. In the future, Hayaku wants to focus more on business-to-business, i.e. integrating their banknote reading technology into third-party devices, for example in specialised telephones for blind or elderly users.

**The Cash Reader application now has 110,000 users around the world and can read currencies from more than 100 countries in 34 languages.**

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**Hayaku & CzechInvest**

The global potential of the Cash Reader application was noticed by CzechInvest, which in 2019 approached Hayaku’s founders with an offer of startup programmes. They chose the one-week CzechMatch acceleration programme in Singapore. “For us, it wasn’t primarily about attending conferences where we would be able to present our product. We rather wanted to find a specific partner for our business in the target destination and join organisations that are focused on blind people. CzechMatch, through which you can get a lot of useful contacts, is ideal for that,” says Jelínek.

Before departing to Southeast Asia, Jelínek and Douděra underwent several hours of mentoring, during which they focused on market research and presentation skills. “I thought our presentation was good, but the opposite was true. However, we trained very well with CzechInvest’s mentors. We were very well prepared for the Asian market, which was interesting for us from the beginning, since it is an area with a huge number of countries with different currencies,” Jelínek says, adding:

“The programme fulfilled our expectations. In addition to joint meetings for all attending startups, CzechInvest’s representatives arranged a lot of meetings that were tailored specifically for us. That was very helpful. With a local partner, we addressed the specific aspects of the market, as well as pricing and potential competition.”

After successfully completing the CzechMatch programme, the startup presented itself in the CzechInvest Startup Challenge 2019 competition and a year later it became one of nine finalists to compete for the title of the most creative startup of 2020 in the Creative Business Cup competition.
The year 2020 was successful for the startup. In competition with 15 other startups, it won the international AI for Accessibility Hackathon, which is held under the auspices of Microsoft, and received CZK 250,000 for the further development of its application. Thanks to this success, Hayaku was nominated for the Vodafone Foundation's prestigious Rafael award, which it also won together with an additional CZK 200,000.

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– Tomáš Jelínek, co-founder of the startup Hayaku

In 2020, Cash Reader won the Vodafone Foundation’s Rafael award, including a cash prize of CZK 200,000.

The Cash Reader application already has 110,000 users around the world and that number is constantly growing.