Co-Designing Mobile Applications for Data Collection in Citizen Science Projects

Challenges and Lessons Learned within the Nachtlicht-BüHNE Project

Friederike Klan[1], Christopher C.M. Kyba[2], Nona Schulte-Römer[3], Helga U. Kuechly[2], Jürgen Oberst[4,5], , Anastasios Margonis[5]

[1]Institute of Data Science, German Aerospace Center (DLR)
[2]German Research Centre for Geosciences (GFZ)
[3]Centre for Environmental Research (UFZ)
[4]Institute of Planetary Research, German Aerospace Center (DLR)
[5]Institute of Geodesy and Geoinformation Science, Technical University of Berlin

funded by HELMHOLTZ SPITZENFORSCHUNG FÜR GROSSE HERAUSFORDERUNGEN

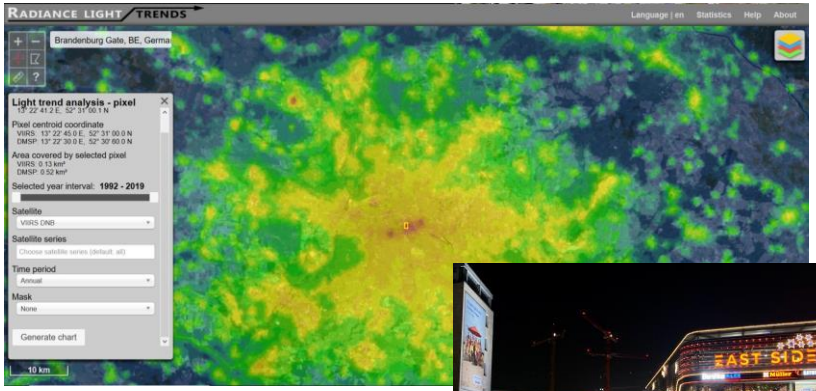
Nachtlicht-BüHNE – Project Goals

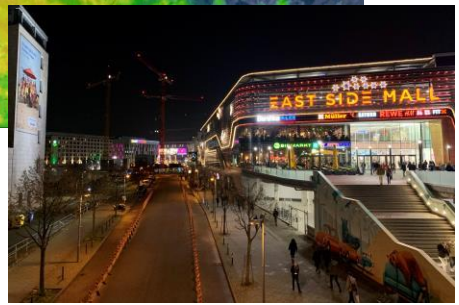
GOAL
Development of a co-design approach enabling scientists and citizens to jointly develop citizen science projects based on smartphone apps

METHOD
in two parallel pilot studies on related scientific topics, we
(1) conceptualize and develop two mobile applications and participatory app design processes
(2) design, plan and organize field campaigns using the mobile applications, and
(3) evaluate our approaches

EXPECTED RESULTS
implementation of the resulting methodologies using suitable tools (e.g. as part of a web platform)

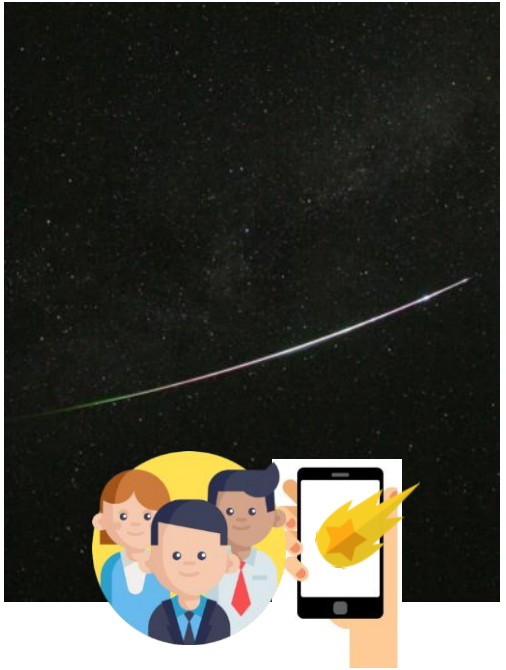
Nachtlicht-BüHNE - Pilot Studies





… identify sources of light emission as the cause of light pollution

Conception and development of two mobile applications in order to …



… learn more about the origin and genesis of comets and asteroids through meteor observations

Citizen Participation in Nachtlicht-BüHNE

Nachtlicht-BüHNE – Research Design

Joint conception & development of two smartphone apps

for the inventory of light sources and
to reporting meteor sightings

Nachtlicht-BüHNE – Data Collection

Planning & implementation of measurement campaigns

inventory of light sources
reporting of meteor sightings

Nachtlicht-BüHNE - Reflection & Evaluation

Joint reflection and evaluation of the co-design process

face-to-face workshop
online feedback

analysis of the effects and impacts of the co-design approaches

Nachtlicht-BüHNE – Why do people participate?

personal experience

motivation

getting others interested in the topic & share knowledge

being part of a research project

light pollution

astronomy

interest

learning something new

connecting with others

methods of scientific research

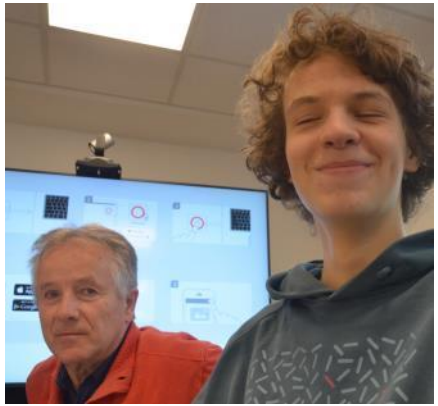
Being part of a network

expectations

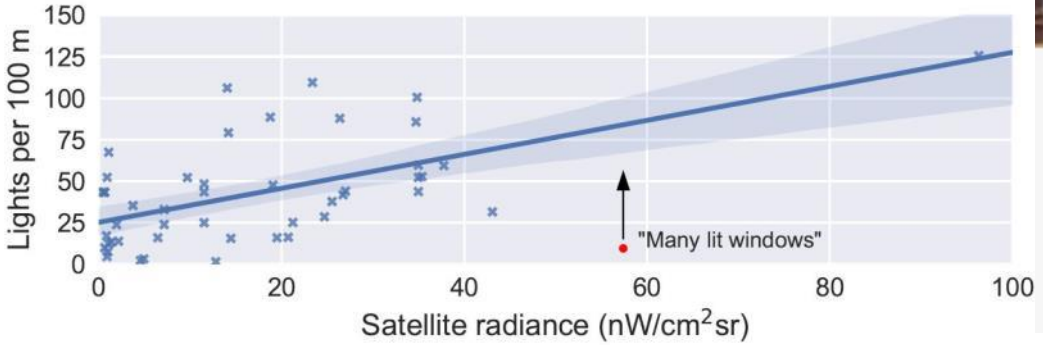
data exchange

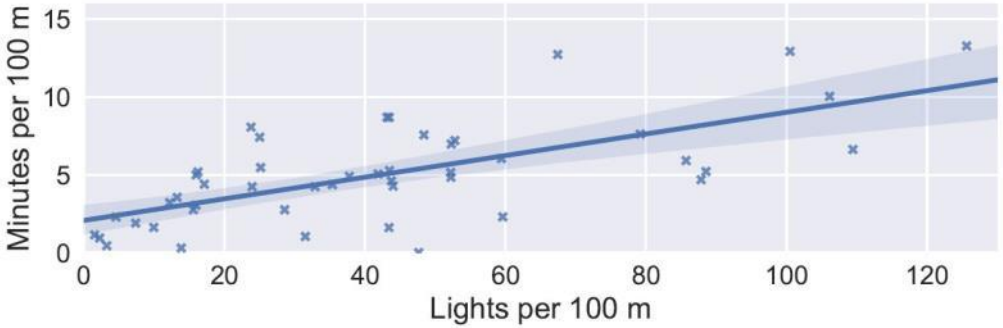
large scale inventory of luminaries, public, private, commercial, And also for dark sky places

technology transfer

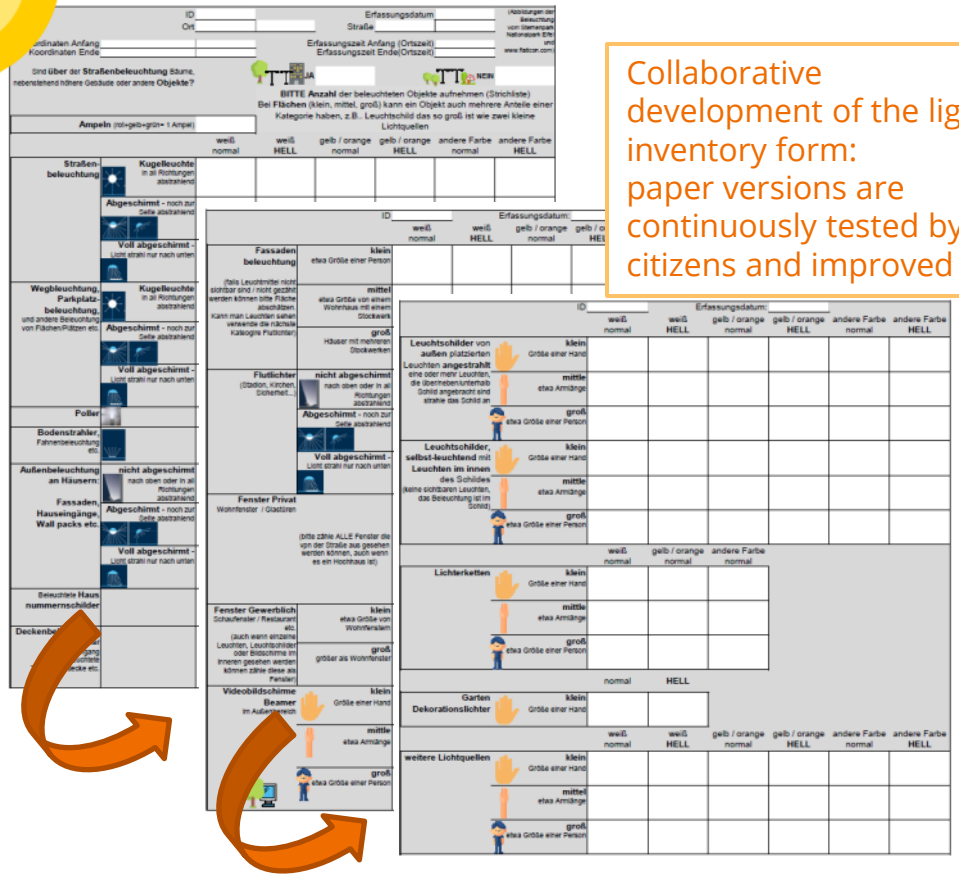


Nachtlicht-BüHNE - Light sources, 1st trial





Nachtlicht-BüHNE - Light sources, 2nd trial



Collaborative development of the light inventory form: paper versions are continuously tested by citizens and improved

Implementation of the mobile app will by done by a company

More information: http://lossofthenight.blogspot.com/

Co-Design of the Meteor App

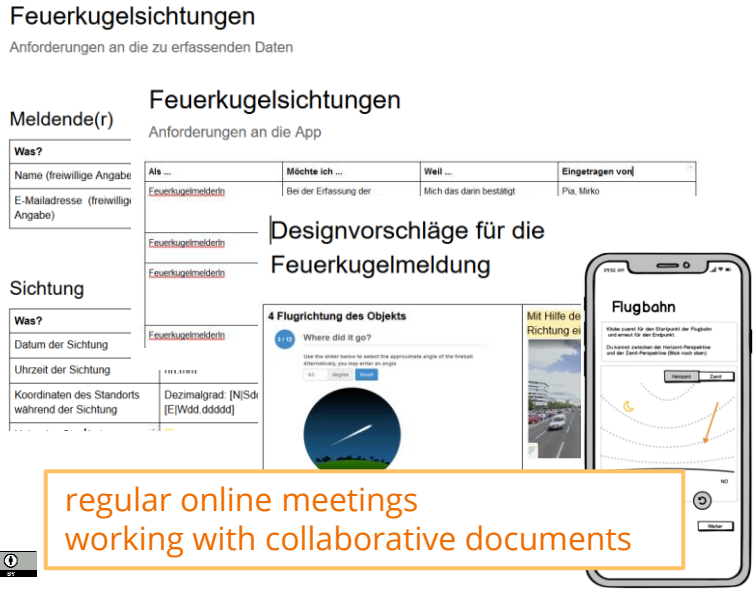
Citizens + Scientists

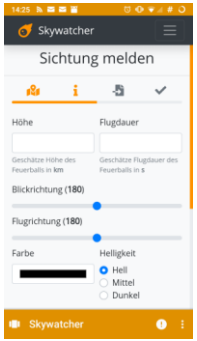
ideation and continuous feedback

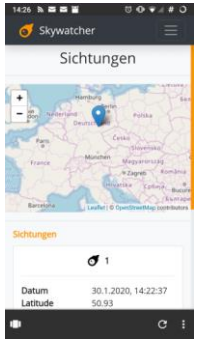
Mediator

continuous and agile development

Student Development Team







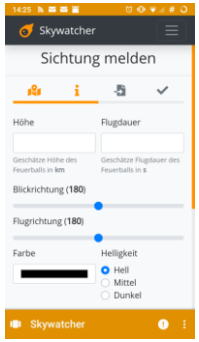
regular online meetings
working with collaborative documents

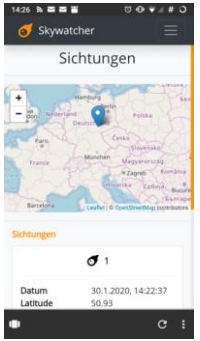
rapid prototyping

Insights & Lessons Learned

- Working together can inspire both citizens and scientists in the long term
- Working in a diverse team takes time
- It‘s important to clarify mutual expectations very early
- Citizen science requires mutual respect and openness
- Taking another perspective triggers learning and generates innovative ideas
- Citizens science happens in the evening
- Temporal synchronization between ideation/feedback and software development work is sometimes difficult
- Citizen scientists start thinking big and also want that the project goes beyond the funding period, they want that the time they put into the project has a long lasting effect
- mailing lists are a great tool, for transparency and collaboration between citizen scientists, also for distribution of news and information about the general topic
- language can be a barrier, if you work with citizen scientists with different native languages (here English and German), with a mailing list that is predominately in German a bilingual exchange does not work

Being Part of Nachtlicht-BüHNE





Try out our app prototypes
Skywatcher app (meteors)
https://skywatcher-development.herokuapp.com
http://skywatcher-development.herokuapp.com/demo

Provide feedback
Skywatcher app http://bit.ly/2tqR4MQ

Check out the blog post of our light pollution activities
http://lossofthenight.blogspot.com

Receive the Nachtlicht-BüHNE newsletter
https://www.listserv.dfn.de/sympa/subscribe/nachtlicht-buehne

Subscribe to the Nachtlicht-BüHNE mailing lists
https://www.listserv.dfn.de/sympa/subscribe/nachtlicht-buehne-light
https://www.listserv.dfn.de/sympa/subscribe/nachtlicht-buehne-meteor

Vorschläge für die Skywatcher App

In diesem Dokument sammeln wir Kommentare, Verbesserungsvorschläge, Wünsche, Bugs für die vom Studententeam entwickelte App. Gerne könnt ihr uns natürlich auch mitteilen, was euch gut gefällt:-)

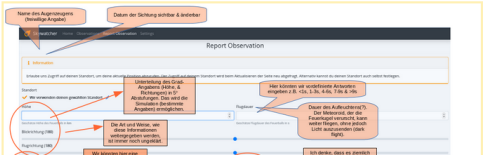
Die aktuelle Version der App könnt ihr unter https://skywatcher-development.herokuapp.com ausprobieren.

Es wäre schön, wenn ihr Kommentare mit eurem Namen/einem Kürzel verseht, dann können wir mit Rückfragen auf euch zukommen.

Ramona
Höhenangabe in km -> kann man schwer schätzen

Friederike
Dauer -> Vergleichsangaben (solange wie ein Blitz, etc.)

Tassos
Blickrichtung sollte O,W,S,N sein
Flugrichtung besteht aus zwei Angaben -> von, nach



Contact

LIGHT POLLUTION PILOT STUDY & APP

Christopher C.M. Kyba
Remote Sensing and Geoinformatics
German Research Center for Geosciences (GFZ), Potsdam

E-mail: christopher.kyba@gfz-potsdam.de

METEOR PILOT STUDY & APP

Friederike Klan
Citizen Science Group, Institute of Data Science, Jena
German Aerospace Center (DLR)

E-mail: friederike.klan@dlr.de

Figure Attribution

- slides 4-7: inspired by the research lifecycle presented on the website of the Professur für Kommunikationsmanagement, Ostfalia Hochschule für angewandte Wissenschaften, Hochschule Braunschweig/Wolfenbüttel
- slides 3-7, 10, 11 icons made by Freepik from www.flaticon.com