CephSmile: Cephalometric Analysis and Treatment Simulation Software

CephSmile is software for 2D cephalometric analysis, focusing on orthodontic treatment planning and simulation of changes on the facial profile after receiving treatments.

CephSmile is able to draw the cephalometric traces of lateral skull and face in both hard and soft surface sections by using the landmarks defined by the dentists. Furthermore, this program calculates the sizes of angles and the distances to be applied for cephalometric analysis.

CephSmile can perform automatic drawing of the significant traces of face, skull, and teeth by using the reference points.

CephSmile provides tools allowing users to mark the correct points with ease. It also enable users to perform various types of cephalometric analysis including Mahidol Analysis, Down Analysis, Steiner Analysis, Tweed Analysis, Jaraback Analysis, Harvold Analysis, Rickette Analysis, McNamara Analysis and ABO Analysis to display the extends of structural problems on skulls, face, and teeth.
CEPHSMILE :- KEY FUNCTIONS

Cephalometric Lateral Analysis

CephSmile program is able to perform curve fitting, and smoothing the trace lines by using only few landmarks. After this process, the program is calculates the angles and distances according to trigonometric rules, and then compares the results with the standard cephalometric values for Thai people.

CephSmile can perform cephalometric analysis with different types of analysis, such as Mahidol Analysis, Down Analysis, Steiner Analysis, Tweed Analysis, Jaraback Analysis, Harvold Analysis, Rickette Analysis, McNamara Analysis and ABO Analysis, which are the significant data that show the structural problems on skulls, face, and teeth.

Superimposition

CephSmile is also able to record the results and apply the recorded data using Superimposition program to compare the results pre and post orthodontic operation.

CephSmile can show a picture of comparative facial changes during the period of oral restructuring, so that the patient can view changes after orthodontic treatment.

Orthodontic Treatment Simulation

CephSmile can determine and simulate dental and facial changes made of a patient’s face after orthodontic treatment. With this simulation, the patients are allowed to see the post-treatment facial structure before the actual orthodontic treatment has been executed. Therefore, the patient who needs braces to correct the teeth’s positions would find the treatment more informative and useful.
**PA Analysis**

CephSmile can perform the Frontal PA Analysis to complete the cephalometric analysis process. The PA Analysis of CephSmile also has a function to perform curve fittings smoothing the trace lines by using only few landmarks. After this process, the program calculates the angles and distances according to trigonometric rules, and then compares the results with the standard cephalometric values for Thai people.

**Dialog for Viewing Patients’ Data**

CephSmile has a special dialog for viewing patient’s data from different directories to be displayed and the users are allow to choose the images for analysis.

**2D Digital Model Analysis & Planning**

CephSmile can perform 2D Digital Model Analysis and Planning, including Bolton Analysis (the measurements of dental width for the individual teeth).
Originality of CephSmile

- Currently, dentists perform orthodontic planning by initially taking the X-ray pictures of lateral surface and then drawing the structure of surface, jaws, and teeth.
- At the same time the distance and angles are measured and calculated by using the stationary, taking a large amount of work and time.
- With this manual method not only storing the results becomes inconvenient, it is also difficult to compare the treatment results from the same patient collecting at different times.
- To reduce such problems, it is necessary to develop CephSmile program, which is able to draw cephalometric trace lines such as the lateral structure of a skull, the soft surface from the landmarks, which is defined by dentists.
- Furthermore, CephSmile can help dentists to calculate the angles and the distances for cephalometric analysis and allows the analyses on the lateral section of the face to detect the structural abnormalities of the skull and teeth.

CEPHSMILE :- KEY FEATURES

- CephSmile has a function to enhance the image intensity of radiographic images to ease the placement of landmarks and trace lines.
- CephSmile can perform image registration of radiographic images on lateral image.
- CephSmile can perform automatic drawing of the significant trace lines of face, skull, and teeth by using the reference points on both Lateral and PA views.
- CephSmile provides tools that allow users to mark the correct points with ease.
- CephSmile can compare the cephalometric analysis result with the Thai Standard Norm and show the difference following to the STD in color values in both lateral and frontal analysis.
- CephSmile is able to read X-Ray image, and Photo images of JPEG and Bitmap format.
- CephSmile has a function to superimpose the trace lines for the image and treatment comparisons between pre-orthodontic and post orthodontic treatment.
- CephSmile can perform 2D model analysis and planning by applying Bolton Analysis.
- CephSmile is for the users who have some knowledge on cephalometric analysis.

CephSmile is developed in collaboration between National Electronics and Computer Technology Center (NECTEC) and Department of dentistry, Faculty of Orthodontic, Mahidol University.

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